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### PYELITIS AND PYELONEPHRITIS: ACIDIFICATION AND MANDELATE THERAPY.<sup>1</sup>

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I do not intend in this lecture to cover the field of renal infections in a strictly systematic manner, but rather to discuss important new conceptions in bacteriology and treatment. I have been invited to lecture on pyelitis, but have taken the liberty of expanding the title into "Pyelitis and Pyelonephritis", since the two conditions usually coexist to a greater or less degree. The term "pyelitis" is very commonly used, simply because it is terse; but in using it people connote infection of the renal

parenchyma as well as of the pelvic mucosa. Pure pyelitis can exist, however, or at least with so little spread to the renal parenchyma as to make no practical difference. In the opposite direction there may be a varying degree of spread of infection and inflammation along the ureter.

#### ÆTIOLOGY.

The question of ætiology is bound up with the problems of bacteriology, such as points of origin of offending bacteria, the route taken by pathogenic germs to enter the urinary tract, proof of actual infective power of organisms as regards the urinary tract, and so on. Some of these factors are more closely associated with primary (descending) renal infection, that is, infection of one kidney through the blood stream or perhaps through the lymphatic channels, from foci on the cutaneous, respiratory or intestinal surfaces of the body.

Bacteria can, however, infect the kidneys, and in this case usually both of them, from below, and the basic problem in this division, called secondary

<sup>1</sup>Lecture delivered for the New South Wales Post-Graduate Committee in Medicine at Lismore on August 8, 1936.

(ascending) renal infection, is to discover somewhere distal to the kidney an area of relative or absolute obstruction. The obstruction may be at the outlet of the renal pelvis itself or so far away as the external meatus. Even when one is reasonably convinced that germs enter the kidney by the hæmatogenous route, one should still exclude the possibility of distal obstruction; for this may have determined the descending infection, which otherwise might not have occurred. Long-standing distal obstruction may lead to grave degrees of "aseptic" (that is, not infected) chronic interstitial nephritis and even to marked hollowing out of the kidneys with severe reduction of secreting parenchyma. Such is very fruitful soil for the growth of bacteria entering from above or below; the resistance of such an organ to infection is low, and a simple catheterization or minor operation may light up infection in an organ where no actual infection existed before.

Our kidneys are probably excreting bacteria fairly often through life, but only in small numbers, and they do not suffer from this scavenging work. Should the numbers met with suddenly become very large, however, or should the effects of distal obstruction be felt, pyelonephritis of variable degree may develop.

An illustrative case is the following:

CASE I.—N.H., a female, aged eighteen years, suffered from occasional pain in the right loin for eight years, especially after exertion. At the beginning of the trouble she had suffered from what appeared to be an acute attack of pyelitis on the right side. There were never any vesical symptoms. Although the tonsils had been removed nine years previously, she had had recent attacks of sore throat. Before coming to me, careful bacteriological investigations had been made by Dr. Shearman and Dr. Shipton. Streptococci were found in pure culture in the faeces and also in the pharynx. The urine contained no pus and no casts; but streptococci were present in pure culture. A complete urological examination, including excretion urograms in the erect position, showed no abnormality in the urinary tract. This patient did not look anæmic; but a blood count showed a septic anæmia. At the time I examined her, bacteria were absent from the urine; but, of course, they were likely to return. It is difficult to remove all foci in the throat, even if such affected parts as the tonsils are removed.

Bowel wash-outs were advised in this case, and an autogenous streptococcal vaccine course. I also advised intravenous antiseptic therapy with mercurochrome if the trouble recurred; but I have not seen the patient since September, 1935. This case is apparently a very good example of intermittent excretion of showers of bacteria through the kidney, causing no permanent damage, but occasional irritative attacks.

In cases of direct trauma to a kidney hæmaturia commonly results, and even without obstruction from clots, judged by the absence of renal pain, it is surprising to note how very frequently infection supervenes. Bacteria are evidently lurking in our kidneys most of the time, to take advantage of diminished local resistance, together with the presence of an enriched medium (urine *plus* blood), and settle down to their activities of multiplying and ravaging.

When no distal obstruction exists the kidneys are only with great difficulty infected from below.

Cultures of germs have been introduced into the urethra and bladder, and even into the ureter, without spread to the kidneys, provided no obstruction with consequent stasis is present. Perhaps the most important safety factor in this immunity is the simple mechanical one of difficulty of ascent through the lumen against a downcoming stream. Apart from ascent through the lumen of the ureter, infection may reach the kidney from a focus in the lower portion of the genito-urinary tract by the lymphatics or the general circulation.

#### Bacteriology.

For many years colon bacilli have been regarded as by far the most common infecting agents in renal infections, whether descending or ascending; but the researches of recent workers make us wonder whether we should continue to accept this idea. The results of study of ordinary cultures point to the colon bacillus as the infecting agent in three-quarters, or even more, of all urinary tract infections. The question now raised is whether the presence, or even the predominance, of a particular germ in the urine is proof of its infectivity to the host. Some workers declare that ordinary cultures are comparatively unreliable indicators of the truly infecting germ or germs, and the method of so-called pathogen-selective culture is supposed to afford a means of detecting the real offender. It is considered that the patient's fresh, whole, coagulable blood will kill off those germs which are present but not infective to the host, and therefore not important; those which survive and grow in the coagulated blood are considered to be the real offenders. If this is really so, then a vaccine made from the survivors should stimulate immunity.

A recent report by Solis-Cohen from the United States of America, after studies in this direction, confirms the impression of a number of other workers that the colon bacillus is often either an innocuous inhabitant of the urinary tract or merely a secondary invader or saprophyte.<sup>(1)</sup> The frequency of coccal infection of the urinary tract is considered, on the contrary, to be far greater than was heretofore thought possible.

Solis-Cohen found that in the infected urine of forty-four patients the germs were not infecting the host in one-quarter of the cases. On the other hand, in nearly 10% of the cultures in the patients' blood, germs grew which had failed to appear in broth; these germs would have been lost entirely if the pathogen-selective method had not been added to the ordinary one. In the same series this worker found that colon bacilli constituted 37% of the germs present in urine containing pus, while staphylococci occurred in the same proportion. Two-thirds of the colon bacilli were found to be infective to the host, and half of the staphylococci. Compared with previous estimates, this is a remarkably high infectivity percentage for staphylococci. Further, in the same series of experiments another most interesting discovery was made; in urine containing no pus staphylococci constituted 68% of the

germs present, and nearly three-quarters of these were infecting the host, while the colon bacilli incidence was only 16%, and hardly any of them were of any causal significance. Streptococci constituted 12% of the germs in urine without pus and were all of aetiological significance. Their incidence in pyuric urine was 10%, and they were nearly all infecting the host.

No mention is made of *Bacillus proteus*, which, though not a very common invader, is important because it shares with some staphylococci the property of splitting urea and making the urine ammoniacal. Solis-Cohen has unfortunately done little research on the question of infection of the urinary tract from the colon; but he has established a close connexion between infective diseases of the throat and nose and of the urinary tract, the same organism being found in both tracts and also found to be causally significant in two-thirds of all cases.

As regards colonic infection, J. H. Hill, associated with other workers, found that of the Gram-negative bacilli the escherichia strains predominate in the faeces, while the aerobacter strains are usually found in urological infections and the blood stream.<sup>(2)</sup> They surmise that the aerobacter strains, being more resistant, survive when introduced into the urinary tract, while the escherichia, though more numerous in the faeces, are killed off when transplanted. This probably accounts for the difficulty experienced for many years in combating colon bacillus infections of the urinary tract, the resistant strain being so often encountered.

In view of the uncertainty regarding the significance of cultures, some recent workers have urged us to pay more attention to the detailed study of ordinary stained smears. The man doing general practice should not be displeased to hear this; he has as a rule to centrifuge the specimen in order to make a rapid wet film survey. After this the wet film may be dried and then carefully and gently fixed at once by heat and put aside to be stained by the Gram method when time allows. It will be found that direct smear examination will reveal a higher relative incidence of staphylococci than with culture alone. This brings the results of stained smears into agreement with the estimates of actual infectivity as deduced from results of the so-called pathogen-selective culture.

#### USUAL CLINICAL TYPES.

**I. The Mild Type:** The infection is confined almost purely to the pelvic mucosa and the symptoms are very slight.

**II. The Acute Type:** The clinical picture is that of the so-called "acute pyelitis"; but the condition is really an acute pyelonephritis, with a more definitely ill patient, higher temperature and more severe pain than in the mild type. Moreover, in addition to pus cells and bacteria, some albumin with red blood cells and tube casts may appear.

**III. The Fulminating Type:** The actual changes in the kidney may be slight; but toxæmia is overwhelming and may rapidly be fatal.

#### SPECIAL CLINICAL TYPES.

**I. Pyelitis of Infancy:** Pyelitis of infancy occurs usually in female children, and the infection is generally colon bacillary.

**II. Pyelitis of Pregnancy:** Dilatation of the ureters occurs normally in pregnancy; but after the fourth to fifth month pressure of the uterus on the ureters is an added factor. Both in this and the preceding type, excretion urography is of great importance in diagnosis.

**III. Chronic Pyelonephritis:** Chronic pyelonephritis may be of ascending or descending origin, and vesical symptoms may dominate the picture. If no pathological changes are evident in the lower genito-urinary tract, complete examination of the upper portion of the urinary tract, including retrograde uretero-pyelography, should be carried out.

**IV. Cortical Infection by Cocci:** Cortical infection by cocci, which is very often the cause of perinephric inflammation and suppuration, has attracted a good deal of attention recently. It usually follows an infection of the skin with *Staphylococcus aureus*, which travels by the blood stream and finally blocks, by bacterial embolus, an artery, small or large, in the renal cortex. The characteristic syndrome in these cases is mild fever, slight localized loin pain, and tenderness, with urine that is clear to the naked eye. If such a urine is centrifuged at high speed (about 5,000 revolutions per minute) for a half to one minute and the deposit stained by Gram's method, staphylococci may be revealed even though none can be cultured.

#### TREATMENT.

##### Fulminating Pyelonephritis.

There is no doubt about the treatment of this overwhelmingly toxic condition—fulminating pyelonephritis. Immediate nephrectomy offers the only chance of saving life. The only question is that of correct diagnosis.

##### Acute Pyelonephritis.

The time-honoured treatment for acute renal infections is complete rest in bed, alkalis, diuretics, purges, and hot applications. Once the very acute stage is passed, general antiphlogistic and eliminative measures are not enough; in other words, they are not directly bactericidal. Hexamine used to be very commonly employed as an antiseptic given by the mouth, but very often is inapplicable, since it causes renal or vesical irritation. A 40% solution of hexamine camphorate, called "Amphotropin", injected intravenously, seems to be better tolerated by the urinary tract and is much more powerful. I have found its use very satisfactory. Where the urine cannot be rendered acid, or is too irritating when acid, one of the "Pyridium" group of drugs is indicated. In the past, in difficult cases with high temperature not responding to oral administration of antiseptics, I have had success, sometimes dramatic, with the intravenous injection of mercurio-



chrome. Where staphylococcal infections are present, the intravenous administration of gentian violet or neocarsphenamine is sometimes specific. Details of these various methods of intravenous treatment are obtainable from a recent paper of mine.<sup>(3)</sup> It seems, however, as though most of the previous methods of treatment will be replaced by hyperacidification and mandelate therapy. This treatment can be applied as soon as the very acute stage has passed.

#### Subacute and Chronic Pyelonephritis.

It has long been known that the growth of pathogenic germs is inhibited if the pH of the urine is reduced to below 5.0. At the other end of the scale, growth of some organisms, particularly colon bacilli, is inhibited if the urine is made very alkaline. This method, however, has now lost its place in our therapeutic equipment as a bactericidal agent, since the degree of alkalinity required is so high (pH of 9.0 or higher). It has been found very much easier to reduce the pH to the region of 5.0. Moreover, it has been discovered that certain organic acids are strongly bactericidal if the pH of the urine is at a moderately low level, namely, 5.2 to 5.4.

Following the discovery that a ketone ( $\beta$ -hydroxybutyric acid) resulting from a ketogenic diet was bacteriostatic, attempts were made to obviate the use of this nauseating diet by using  $\beta$ -hydroxybutyric acid itself. This acid, however, is oxidized during its passage through the body and is therefore not excreted unchanged in the urine. Rosenheim<sup>(4)</sup> later discovered that mandelic acid, an hydroxy acid, which had long been used as a chemical reagent, was excreted unchanged in the urine and was a satisfactory bacteriostatic agent. The formula of this acid is  $C_6H_5CHOH.COOH$ . Mandelic acid is too severe a gastric irritant to be exhibited as such, and is therefore given in the form of its sodium salt. If concurrently some acidifier is given allowing excretion of hydrochloric acid in the urine, a reaction occurs there with the formation of sodium chloride and mandelic acid.

Crance and Maloney<sup>(5)</sup> consider that it is the degree of acidity rather than any specific anti-septic agent, such as a ketonic or hydroxy acid, which destroys or inhibits bacterial growth. Fuller,<sup>(6)</sup> on the other hand, says that excretion of ketones causes urine to become more acid than normal, but that this change in reaction is not the only factor in inhibiting bacterial growth. He says that ketonic urine inhibits the growth of colon bacilli to a much greater extent than normal urine rendered acid to the same degree by the use of acid salts. Nevertheless, since it is agreed by all that whether we use pure acidification or mandelate therapy we must lower the pH figure of the urine to 5.3 or less, let us first discuss this pH figure and then consider the problem of acidification, after which we may go on to mandelate and dietetic treatment.

#### Estimation of the Urinary pH.

We must first of all briefly discuss the significance of the pH figure. All liquids of which water is a constituent contain a certain number of free positively charged hydrogen ions (acid ions) and a certain number of negatively charged hydroxyl ions (alkaline ions). In a neutral liquid the numbers, that is, concentrations, of these two different ions are equal. It is customary in referring to the acidity or alkalinity of a fluid to speak of the degree of concentration of the acid or hydrogen ions only. In any liquid the product of the concentrations of the hydrogen and hydroxyl ions is constant and has been found to be 0.000,000,000,000,01, that is,  $10^{-14}$ , there being 14 decimal places. In a neutral liquid the hydrogen ion concentration is  $10^{-7}$  (0.000,000,1), and the hydroxyl ion concentration is the same. The product of the two,  $10^{-7} \times 10^{-7}$ , is  $10^{-14}$ . To use smaller figures, decinormal hydrochloric acid has a hydrogen ion concentration of  $10^{-1}$ . This means that in one litre of this solution there is present 0.1 (one decimal place) gramme of free ionized hydrogen.

These types of figures are inconvenient for ordinary practical purposes, so by convention the index of the hydrogen ion concentration with the *minus* sign changed to the positive is used and is called the pH of the urine. Thus, as we have seen above, in a neutral solution the hydrogen ion concentration is  $10^{-7}$ , and this is expressed as pH = 7.0. A very highly acid solution, such as decinormal hydrochloric acid, has the hydrogen ion concentration of  $10^{-1}$ ; therefore its pH figure is expressed as 1.0.

The pH of the urine of a patient taking an ordinary mixed diet is somewhere about 6.0, and since the neutral point is 7.0, this means that normally the urine is slightly acid. Our object in acidification therapy is to reduce the pH figure to somewhere between 4.8 and 5.3. The colour index most suitable for this range of pH is methyl red, which gives a bright rosy pink if the pH is at or near 5.0, but a distinctly yellowish colour at 6.0. At 5.5 to 5.6 the colour is orange; but a reddish tinge creeps in at 5.4, is more distinct at 5.3, is quite definite at 5.2, and at 5.1 all suspicion of the orange admixture has disappeared. Since, with acidification treatment, the practitioner is wise to regulate his treatment by an occasional pH estimation, a simple and convenient instrument for this purpose is desirable. I have designed a pH estimator which is a modification of Cole and Onslow's simple box comparator. This instrument is made by Elliotts and Australian Drug, Limited. It consists of three compartments, through which colours are estimated by looking through opal glass at a diffuse source of light. At each end of the instrument are compartments for three tubes of buffered colour standards. The pH figures of these six colour standard solutions are respectively: 5.0, 5.2, 5.4, 5.6, 5.8 and 6.0. To 10 cubic centimetres of urine are added five drops of methyl red indicator



(0.1% methyl red in absolute alcohol), which is supplied separately with a glass dropper. The colour is distributed by shaking the tube. Behind the urine under test is placed a tube of plain water; in the compartment on each side is placed a colour standard tube, and behind each of these is placed a tube of the patient's urine. One may look through the instrument from either direction. The important thing is the quality or tone of the colour. Sometimes the colour of the urine under test does not look so dense as that of the colours on each side of it; one can disregard this and simply decide whether it is redder or more orange or yellowish than the colour standard on each side of it. This is really a simple matter if various combinations of colour standards are placed on each side of the urine. It is important as soon as the test is over to replace the sealed colour standard tubes in their compartments at each end of the instrument and to replace the top. In this way light is excluded and fading prevented. With care the colour standards should last for six months, and after this period they should be replaced.

#### *Acidification of the Urine.*

In the past quite a number of urine acidifiers have been employed, the most recently favoured being ammonium chloride in capsules or enteric-coated tablets. In 1935 a most powerful acidifier was introduced by Crance and Maloney<sup>(7)</sup> in the United States of America. These authors advocated the use of strong nitrohydrochloric acid taken by mouth in doses of 0.6 cubic centimetre (10 minims), very well diluted. They claimed that in most cases acidification was rapid and powerful. In their opinion it is the strength of the acidity of the urine rather than any so-called specific agent, such as  $\beta$ -hydroxybutyric acid, which causes bacteriostasis. However this may be, my own experience leads me to be very well satisfied with their claim that strong nitrohydrochloric acid is a powerful acidifier of the urine. Moreover, it is much freer from the objection attached to ammonium chloride of very often causing nausea, vomiting or giddiness, when given in adequate doses, and occasionally renal epithelial damage, as shown by the appearance of casts or albumin in the urine. I have used doses of 0.6 cubic centimetre (ten minims) to start with, but increase every two to three days by 0.12 cubic centimetre (two minims) until 1.0 cubic centimetre (16 minims) of the acid is given in each dose. This medicament used to be included in the United States Pharmacopœia as *acidum nitrohydrochloricum forte*, but it does not seem to be in the United States Pharmacopœia at present. It appears, however, at present, in the National Formulary of the United States of America. The composition is hydrochloric acid (82%) and nitric acid (18%); no water enters into its composition. The mixture should be flavoured with four mills (one drachm) of syrup of orange and made up to 15 mills (half an ounce) with chloroform water. The dose is diluted

with a full glass of water and washed down with half a glass of plain water.

Our object is to reduce the pH figure to 5.0 or slightly less if acidification alone is to be relied on for bacteriostasis. If mandelate therapy is to be used, it may be commenced when the pH figure reaches 5.3. When the pH figure can be reduced only to somewhere in the region of 6.0, acidification is useless *per se*, and mandelate therapy is not applicable. Hexamine, however, can be given between meals, while acidification is continued after meals.

A. T. Fuller<sup>(8)</sup> thinks that the specific agent resulting from the application of a ketogenic diet, for example,  $\beta$ -hydroxybutyric acid, is bactericidal, and his remarks would apply equally to mandelic acid. Fuller contends that ketogenic urine inhibits the growth of colon bacilli to a much greater extent than normal urine rendered acid to the same degree by the use of acidifying salts. H. F. Helmholz<sup>(9)</sup> considers that the urine of patients in ketosis may contain substances that have a bactericidal action independent of their acidity. In any case it is agreed that mandelic acid taken by mouth in the form of mandelates will act powerfully only if a certain degree of urinary acidity is reached. The ketogenic diet was destined never to be a practical success, since it is repugnant to most patients. We may consider that its use has been replaced by mandelate therapy. Salts of mandelic acid are very costly at present; but as against this it should be explained to the patient that there is more chance of bacteriostasis with these drugs than with any that we have used hitherto. In my routine public hospital practice at present, so as not to put too much burden on the hospital, I am acidifying urine with the strong nitrohydrochloric acid, and when the urine is acid to litmus, giving hexamine between meals in doses of 1.0 gramme (15 grains). Apart from renal infections, this is a very useful routine both in the preparation and after-treatment in bladder and prostate operations.

Acidification, whether with strong nitrohydrochloric acid or mandelates, is contraindicated where any degree of acid dyspepsia is or has been present; also when any serious degree of nephritis exists; for direct renal epithelial damage may be caused, and even acidosis, if renal efficiency is not good. In any case, if the renal efficiency is poor, a bacteriostatic or acid cannot be excreted in sufficient concentration to act efficiently. When only a slight degree of nephritis is present, with superadded infection, acidification and mandelates are justified. When ammonium chloride is given, it decomposes into ammonia and hydrochloric acid. The ammonia is converted into urea, which is excreted by the kidneys. The hydrochloric acid is partly excreted by the kidneys and partly neutralized by the blood and tissues. The earlier changes need not be gone through when hydrochloric acid is given in the form we have indicated, that is, combined with a little nitric acid. One should be

careful not to prescribe dilute nitrohydrochloric acid; for this is a very much weaker solution.

When urea-splitting organisms are present, ammonium chloride may fail to acidify the urine, since the increased urea excretion leads to the formation of ammonia in the urine from the action of these organisms. In any case, since it is better tolerated by the patient and is more powerful as an acidifier, I see no reason to use anything other than strong nitrohydrochloric acid.

#### *Dietetic Treatment.*

Since mandelates have been introduced the necessity for dietetic treatment has fallen into the background; but it still has its place when a sufficient degree of acidity cannot be obtained either from mandelates alone or from mandelates combined with strong nitrohydrochloric acid.

The original ketogenic diet described by Clark and Helmholtz, of the Mayo Clinic, in 1931,<sup>(10)</sup> consisted of large amounts of fat, an adequate amount of protein and a minimum amount of carbohydrate. I have mentioned that the diet is repugnant to most patients.

Nesbit, McDonell and Rourke<sup>(11)</sup> have suggested a "low calorie, low fat, ketogenic diet" to replace the original one. In it the patient is not forced to take a large amount of fat, but rather to reduce severely certain constituents of the food, namely, carbohydrates, while the total amount of food allowed is small; in short, a semi-starvation diet. Some weight is lost; but since suitable patients are nearly always of normal weight, this does not matter for a short time, and in any case thin or emaciated patients are not suitable subjects for any form of ketogenic treatment. For the average adult a rough menu plan of this diet may be taken to be as follows (a list of the carbohydrate content of suitable vegetables and fruits is given after the menu plan):

*Breakfast:* One egg; two strips of bacon; one tablespoonful of cream; half a cupful of cooked 5% vegetables; non-carbohydrate bread<sup>1</sup> as desired; butter as desired; tea or coffee.

*Lunch:* Two eggs, or two ounces of meat, or two ounces of fish, or three tablespoonfuls of cheese; half a cup of raw 5% vegetables or one-third of a cupful of cooked 5% vegetables; a small amount of 5% fruits; one tablespoonful of cream; butter as desired; mayonnaise (made with yolk of egg, olive oil and vinegar only) as desired; tea or coffee; non-carbohydrate bread as desired.

*Dinner:* A similar plan to that of lunch, making the two meals vary somewhat.

Vegetables containing 5% of carbohydrate are asparagus, cabbage, cauliflower, celery, cucumber, French beans, lettuce, green and red peppers, pumpkin, radishes, rhubarb, spinach, tomatoes, turnips, vegetable marrow and watercress. Fruits containing 5% of carbohydrate are lemons and melons and strawberries.

<sup>1</sup> Take two cups of bran in a butter-muslin bag; suspend under a tap, and wash till the water comes away clean. Then mix with two eggs, one ounce of butter and half a teaspoonful of salt. Spread the mixture about a quarter of an inch thick in a sandwich tin that has oiled paper on the bottom; bake the biscuit in a moderate oven for twenty minutes. Then turn over into another prepared sandwich tin and cook again for fifteen minutes.

It is to be noted that, apart from the small amount of carbohydrate in the allowed vegetables and fruits, the patient gets practically none at all. He should not be allowed to eat anything that is not in the above list. Since the diet is continued for only two to three weeks he will probably cooperate. It has long been known that the body is not dependent on exogenous fat for its metabolic mixture, but calls on its endogenous supply whenever the energy supply of the diet is below the patient's requirements. Ketosis develops when the available glucose is inadequate completely to oxidize the fats. In the above diet the available glucose is very small, so that the products of incomplete combustion of fatty acids—ketone bodies—appear and are excreted.

Another and a more easily tolerated form of diet applicable for longer periods, is the "acid-ash diet". It is particularly applicable when there is a tendency to phosphatic deposition or calculus formation, and if the diet has to be regulated for months or even years. It consists chiefly of fish, eggs, bread and cereals, giving a very acid ash, owing principally to the presence of acid phosphate. To this may be added internal organs, which give rise to a liberal supply of acid, owing to the production of phosphoric acid from the hydrolysis of nucleoproteins in such foods. Some meat may be taken as well as fish. About two ounces of sugar are allowed daily, three ounces of butter, but a rather small amount of fruit and vegetables. For the details of this diet I would refer you to a paper by Lyon, Dunlop and Stewart, published in 1931.<sup>(12)</sup>

These writers were concerned, from the point of view of nephritis, with the harmful effects of an acidic diet. Now, only a little later, we are, for infections of the kidneys, deliberately trying to acidify. We must, nevertheless, be continually on guard against causing renal damage, as shown by the appearance or increase of casts or albumin in the urine. Moreover, if renal efficiency tests are made before treatment, they should show improvement and not retrogression as we go on.

#### *Mandelate Therapy.*

Sodium mandelate was the first salt of mandelic acid to be used as a bactericidal substance, and the earliest reports were very optimistic. My own experiences with sodium mandelate are happy, especially if no obstructive element is present. I have found that even with chronic fibrotic changes or dilatation of a limited degree, mandelates are more powerful in eradicating or reducing infection than any other oral antiseptic previously employed. Recurrences are met occasionally, however, and this is an indication for more intimate investigation, such as retrograde pyelography and, if thought advisable, local treatment by dilatation and antiseptic instillations. Sodium mandelate may be prescribed in a simple mixture with syrup of orange and chloroform water, using 3.43 grammes (50 grains) of the salt in each dose of 16.0 mls (half



an ounce) of the mixture. The patient is directed to take each dose in about twice as much water before each meal and on retiring to bed, that is, four times a day. Sodium mandelate will not act strongly as an antiseptic until a certain degree of urinary acidity is reached. The reason for this is not quite clearly stated by the workers who have so far written on the subject; but one writer says that, when ammonium chloride is given concurrently, the hydrochloric acid excreted in the urine reacts with sodium mandelate to form sodium chloride and mandelic acid, the latter being the actual antiseptic. The same reaction occurs when one gives strong nitrohydrochloric acid. For this reason one should not give sodium mandelate until the pH of the urine has been reduced to 5.3 or less with strong nitrohydrochloric acid. Once the effect of the mandelate is felt the pH usually remains at a low figure and acidification may be discontinued. Before this, however, both mixtures may be given concurrently. At each visit the pH figure should be ascertained by means of the pH estimator previously described. If, however, the patient lives at a distance, he should be instructed to add five drops of methyl red indicator to 10 cubic centimetres of urine and obtain a reddish tinge, which is more red than orange, but not so red as to be a definite rose pink. The patient should be instructed to take enough strong nitrohydrochloric acid to attain this reaction, but no more. The sodium mandelate should be continued until the urine is clear to the naked eye, and for about two weeks after this. It is considered advisable not to continue acidification and mandelate treatment for more than about three weeks at a time. One can resume it with safety, no doubt, after one week's interval.

Sodium mandelate is also made up in the form of large tablets, already flavoured, the weight being a single dose of the drug (3.43 grammes). These tablets are broken up with the fingers and dissolved in about one-third of a glass of water. This is a very convenient method.

The most recent development in mandelate therapy is only a few months old. In April of this year, in England, Holling and Platt<sup>(13)</sup> described their experiences with another salt of mandelic acid, ammonium mandelate; but they were able to report on only four cases, apart from experiments on themselves as regards the urinary pH. They found that ammonium mandelate was a powerful acidifier of the urine. It was hoped that one drug would act both as acidifier and antiseptic, and it seems as if in the majority of cases this hope is justified. The objection to ammonium salts, mentioned above, that when urea-splitting organisms are present acidification may fail, may be applicable in this case; but so far I have not been able to decide this point. The important thing is that in the majority of cases ammonium mandelate is a strong acidifier and antiseptic for the urine, and will probably replace all previous urinary antiseptics commonly employed.

I have found that the pH figure reaches a low level within a day or two, namely, 5.0 to 5.3. This salt is hygroscopic and therefore cannot be used in tablet form. In dispensing, the crystalline salt may be used for making up the mixture, but it will be found more convenient to keep the salt in solution. The first experiments were made with the elixir of ammonium mandelate put up by an English firm, the British Drug Houses. I have suggested to Elliotts and Australian Drug, Limited, that they supply this salt in the form of a syrup, already flavoured, eight cubic centimetres (two drachms) of which contain a dose of the drug, namely, 3.43 grammes (50 grains). Eight cubic centimetres (two drachms) of this *Syrupus Ammonii Mandelatis* should be made up to 16.0 cubic centimetres (half an ounce) with plain water for each dose in prescribing. The patient is instructed to take one tablespoonful of the mixture with about twice as much water before each meal and on retiring to bed. I prefer this method; for if the correct pH level is not reached, strong nitrohydrochloric acid may be taken after meals in addition. With ammonium mandelate, however, the additional acidifier is only rarely necessary.

In treating pyelitis of pregnancy with mandelates, the practitioner may fear renal epithelial damage by reason of the great acidification achieved. Provided, however, one watches the urine carefully for casts or albumin, and one prevents the pH from descending to too low a figure, there should be no reason for avoiding mandelates. The pH estimator is very simple to use, and after a few lessons any competent nurse or resident medical officer should be able to take the readings in the ward and record them on the chart. I suggest that every ward where urinary cases are treated should have one of these estimators. If one wishes to take extra care, the pH may be reduced to 5.3, but no further. If, for instance, with ammonium mandelate, it descends below this point, one may change over to sodium mandelate, or, if one prefers to continue with ammonium mandelate, I would suggest giving a little powdered sodium bicarbonate in milk occasionally so as to bring the pH figure up to the level of 5.3.

In pyelitis of infancy, between the ages of one and four years, the dose of ammonium mandelate should vary between 0.36 and 0.72 gramme (6 and 12 grains), that is, one to two cubic centimetres (one-quarter to one-half of a drachm) of the syrup. For patients between four and ten years of age it should vary between two and four cubic centimetres (half to one drachm); between ten and fourteen years, four to six cubic centimetres (one to one and a half drachms) may be given; and between fourteen and eighteen years the dose should be six to eight cubic centimetres (one and a half to two drachms).

With acidification and mandelate therapy it is important to note not only that a powerful bacteriostatic effect is exerted on colon bacilli, but that this effect is equally as powerful and often more powerful on the various kinds of pyogenic cocci.

## ILLUSTRATIVE CASES.

There is not space to report on all the patients treated by acidification and mandelates; but I append the reports of six cases, the first three illustrating the effect of acidification alone, and the other three illustrating the powerful effect of mandelic acid given in the form of ammonium mandelate.

CASE II.—M.W., a female, aged twenty-nine years, was referred to me on September 20, 1935, at the Royal North Shore Hospital, by Dr. E. L. Newman, with a history of twin miscarriage followed by manual removal of the placenta one month before. Since then she had been running an irregular, slightly remittent temperature for about one month; but there were now no signs in the pelvis. The urine was turbid with pus and there was a heavy growth of colon bacilli. She was rather ill and suffered from headaches. A plain skiagram revealed no abnormality. An excretion urogram was done. Since this showed no abnormality, I thought it would be a good opportunity to avoid cystoscopy and catheterization of the ureters and to try the effect of acidifying the urine alone. She had previously had "Neotropin" and later hexamine, without effect on the temperature or the pyuria. Acidification with *Acidum Nitrohydrochloricum Forte* in a dose of 0.6 cubic centimetre (ten minims), three times a day, after meals, was commenced on September 21. The accompanying chart (Figure I) illustrates the disappearance of pyrexia about three days later. The temperature is

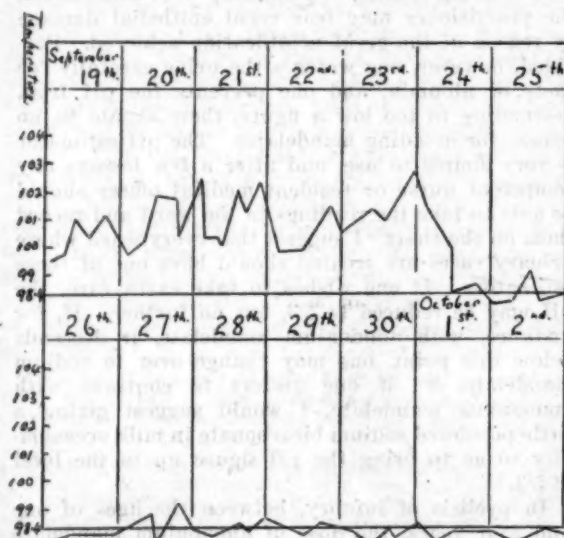


FIGURE I.  
Temperature chart of the patient in Case II.

shown for only a couple of days before commencement of acidification and for several days afterwards; but it remained approximately normal until she was discharged on October 3, when she left hospital, very well. The pH attained during the treatment was in the region of 5.0, the minimum being 4.8. The urine when she left hospital was, unfortunately, not investigated by culture; but it was almost clear to the naked eye, and I asked her to report to me at the hospital in a month's time. This, however, she has failed to do, so I take it that she is still well.

CASE III.—L.P., a female, aged twenty-three years, was referred to me at the Royal North Shore Hospital in February, 1936, with persistent pyuria and colon bacillary urinary infection. She had had pyrexia for a little while

before labour two months previously, and it had persisted since, not having responded to alkalis, hexamine or "Neotropin". I found nothing abnormal in the plain radiogram or in the excretion urograms, so tried the effect of strong nitrohydrochloric acid only, without any local treatment or examinations whatever. The urine gradually cleared up and the temperature fell, and in a little under three weeks everything was normal. I then performed cystoscopy to check the results. Nothing abnormal was found.

CASE IV.—A.S., a female, aged forty-seven years, complained of pain in the loin. Her temperature was raised. There was a colon bacillary infection and there was pus in the urine. Since the plain radiogram and excretion urograms revealed no abnormality, strong nitrohydrochloric acid treatment alone was tried. In two days the pH figure fell to 4.8. On the fourth day it was 5.0, on the eighth day it was 5.3, on the tenth day 4.8, and on the fourteenth day it was 5.0. The patient then left hospital with an absence of symptoms and a clear urine. She was seen again two weeks later with a crystal-clear urine and no recurrence of symptoms.

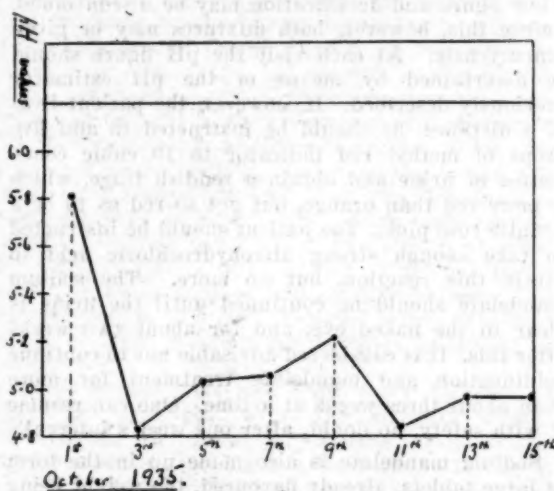


FIGURE II.  
Graph showing the pH values of the patient's urine in Case IV.

CASE V.—F.G.M., a female, aged fifty-two years, was referred to me by Dr. M. Frisell, of Burwood. She had complained of haematuria for the surprisingly long period of fifteen years. There were no localizing symptoms except an occasional recent slight dull pain in the right loin. The bleeding had been of only infrequent occurrence originally, but in the past couple of years had occurred at shorter intervals and had lasted longer; the present attack had lasted continuously for three months, and she was still bleeding when I examined her. Clots appeared in the urine occasionally. No special examination had ever been performed. The urine was heavily coloured with well-mixed blood. Pus cells and colon bacilli were present. A plain radiogram revealed no abnormality. Cystoscopy showed blood coming from the right ureter and a clear efflux from the left side. A right retrograde pyelogram was unsatisfactory, as pain and clots caused spasms. Cystoscopy was repeated a few days later, preceded by an excretion urogram. The latter gave excellent delineation of the renal pelvis and calyces, which were quite normal in outline. Specimens from each kidney were examined on this occasion and pus cells and colon bacilli were found on the left side as well as the right. Three cubic centimetres of 5% silver nitrate solution were injected into the right kidney pelvis in an attempt to stop the haemorrhage. No local treatment was given to the left



kidney. The patient was sent home two days later, taking ammonium mandelate four times a day. About two weeks later a third cystoscopic examination was made. To my surprise, the urine from the bladder and from each kidney was crystal clear to the naked eye, and no deposit was seen microscopically. The patient told me that the bleeding started to decrease a couple of days after the second cystoscopic examination and then gradually disappeared. Probably the hæmaturia in this case was entirely infective; but it was so alarming and so long continued, with secondary anemia appearing, that I contemplated nephrectomy. The patient, however, has remained free from bleeding and infection since ammonium mandelate was used, and probably will continue to do so. It will be specially noted that although no silver nitrate was injected into the left kidney the infection in that kidney disappeared later, apparently under the influence of ammonium mandelate. The pH of the urine at the third cystoscopic examination, one week after the commencement of the ammonium mandelate treatment, was 5.0.

CASE VI.—E.N., a female, aged seventy years, was referred to me by Dr. J. C. Binns, of Naremburn. She was suffering from intense pain in the bladder before and after urination, and a good deal of frequency of micturition. There were no renal symptoms, and, as we proved later, no renal infection; but she gave a history of pyelitis three years previously. A heavy colon bacillary infection was present. She gave a history of failing to improve on alkalis and "Neotropin". When acidification was commenced she improved slightly; but it was found difficult to acidify the urine sufficiently. Later on she was admitted to the Royal North Shore Hospital, where a catheter was tied in and the bladder irrigated gently, irrigations being continued for over two weeks. The patient left hospital improved but not completely well. The pH had descended while she was in hospital to 5.0. After she left hospital I gave her ammonium mandelate, and the pH descended to 4.9. Under the influence of this drug her urine cleared up rapidly, until on the seventh day it became absolutely clear, and the patient was free from symptoms. About two weeks later the urine was still quite clear and symptoms were absent.

CASE VII.—K.B., a male, aged forty years, was referred to me by Dr. B. W. Stevenson, of Waverley, complaining of cystitic symptoms for six weeks, with the passage of muchropy pus and mucus. The urine was heavily infected with colon bacilli and staphylococci, and was strongly alkaline and offensive. A plain radiogram showed nothing abnormal. Excretion urography showed a dilated and tortuous left ureter. Both kidney pelvis were slightly dilated. The patient was ill, with infection, back pressure, and some degree of renal failure. There was a good deal of residual urine, and on cystoscopy it was discovered that the renal efficiency was poor on both sides. The bladder cavity was normal, except for the trigone, which was very congested. The posterior urethra was very inflamed and ulcerated, and the *colliculus seminalis* hypertrophied. Rigors followed this examination. The patient was treated with a tied-in catheter, irrigations, and strong nitrohydrochloric acid by mouth. The urine cleared up very well and later the posterior urethra was canterized and the *colliculus seminalis* coagulated to reduce its size. At this cystoscopy it was noted that the function of the right kidney had improved, but on the left side the function was still poor. The patient improved a good deal and left hospital with a fairly clear urine and only two ounces of residual urine. Some weeks later he developed a slight recurrence of the infection, with five ounces of residual urine. He improved with irrigations and acidification. Later still, a heavy coccal infection appeared in the urine and the pH proved to be 6.0. The patient had not been taking the strong nitrohydrochloric acid for two weeks previously. I thought this would be a good opportunity to try the effect of ammonium mandelate without any other treatment, such as a tied-in catheter, irrigations *et cetera*. He came back to see me five days later with his urine absolutely clear microscopically, and a pH of 5.1, and this condition of affairs has been maintained since.

#### THE RESULTS OF TREATMENT.

In all, thirty-seven patients with various urinary tract infections were treated by acidification or mandelates. In about one-third of these cases there was no renal infection, but only vesical or posterior urethral infections. At the beginning of this work acidification alone, with strong nitrohydrochloric acid, was the method employed. In the majority of cases the results were satisfactory; but in some thorough eradication of the infection was made possible only by the addition of sodium mandelate or by the administration of ammonium mandelate instead.

Seventeen patients were treated with strong nitrohydrochloric acid alone, success being complete in thirteen and partial in four; in three of the latter an organic lesion was present, while in the fourth the acidification caused severe bladder irritation.

Nine patients were treated with ammonium mandelate alone, with success in seven and partial success in two. No organic lesions were present in any of this group.

A difficult group of cases were those treated with strong nitrohydrochloric acid followed or accompanied by sodium mandelate. There were six cases in the group, with failure in two, partial success in two, and success in two. Organic lesions were absent in the two successful cases only.

Five patients, to whom previous treatment with strong nitrohydrochloric acid had been given, were treated with ammonium mandelate. In one case the treatment failed, in two it was partially successful, and in two successful.

#### SUMMARY.

It can with some justification be concluded that hyperacidification of the urine is a powerful bacteriostatic or even bactericidal method. The addition of salts of mandelic acid reinforces this action. A combination of the two effects may be achieved in most cases by the use of ammonium mandelate, which both acidifies the urine and allows the excretion of mandelic acid.

#### ACKNOWLEDGEMENTS.

I should like to acknowledge the valuable help given to me, in connexion with the estimation of urinary acidity, by Dr. E. B. Jones, of the Prince Henry Hospital, Sydney; Dr. M. R. Lemberg, of the Royal North Shore Hospital, Sydney; and Professor H. Priestley, of the University of Sydney.

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### PULMONARY TUBERCULOSIS: A SURGEON'S INQUIRY.

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HAVING been appointed by the staff of the Royal Prince Alfred Hospital to a committee charged with the preparation of a report for presentation to the Board of Directors, on the subject of the admission of tuberculous patients to the hospital, I made an exhaustive search of the recent literature. Ample and irrefutable confirmation was found of an instinctive feeling that pulmonary tuberculosis was a contagious disease like many of the acute infections.

Because tuberculosis is slow and insidious in onset and often chronic in course, and for the reason that the degree of exposure required to transmit infection is an unknown quantity, many people fail to recognize the risk run by those who are in contact with patients suffering from pulmonary tuberculosis.

The subject is so important and the gathered information so authentic that a sense of duty prompts me to pass on to the profession the results of my inquiry in the hope that people will take their ostrich heads from out the sand and look about them for the truth.

The mortality of tuberculosis is falling like the stick of a sky-rocket, all over the world. It seems very doubtful whether there is a proportionate decrease in the morbidity, especially in young adults. In any case, the morbidity in this State is unknown; for there is no compulsion to notify the infection unless tubercle bacilli have been found in the sputum.

The one firmly established fact about tuberculosis is that it is due to the tubercle bacillus. Surely it is reasonable to suppose that the most effective method of prevention is the reduction to a minimum of the possible exposure to tubercle bacilli. Some physicians seem to pin their faith on the failing hypothesis that all adult tuberculosis is due

to a "Ghon lesion" acquired in childhood. I have found much authentic evidence which suggests that "Ghon" should read "gone".

#### HISTORICAL.

In "A System of Bacteriology" (Volume V, 1930),<sup>(1)</sup> issued by the Medical Research Council, the section on history is written by Professor W. Bulloch, of London Hospital. On page 152 he says: "The infectivity of tubercle was, however, proved by the French military surgeon, J. A. Villemin (1827-92), in a series of epoch-making papers published between 1865-9, and in a large book (1868)." On page 153<sup>(1)</sup> he refers to Robert Koch (1882) as the successful finder of the tubercle bacillus. On page 155<sup>(1)</sup> he mentions Koch's mistake of 1901, when the scientist announced that the bovine bacillus was harmless to man. He adds that: "In the main it may be said that Koch's conclusions have proved to be correct; and it is admitted today that pulmonary consumption of man, which constitutes the great mass of human tuberculous conditions, is to all intents and purposes transmitted by man."

#### EXPERIMENTAL.

In the same volume of "A System of Bacteriology" Griffith describes experimental tuberculosis.<sup>(2)</sup> On page 177 he states:

The experiments of many observers have shown conclusively that pulmonary tuberculosis is readily produced in susceptible animals by making them breathe air containing tubercle bacilli in suspension, either as dust or in spray from a Buchner apparatus . . . With regard to the number of bacilli which suffice to infect by the respiratory route, there is every reason to believe from the careful experiments of B. Lange (1926) that one virulent bacillus is sufficient . . . The tuberculosis produced in guinea-pigs and monkeys by inhalation rapidly becomes generalized and is invariably fatal; in monkeys the process extends locally and quickly implicates the whole of the lobe. The intestines and mesenteric glands escape infection altogether in the early stage of the disease and are only affected later as part of a generalized tuberculosis.

#### TUBERCULOSIS IN MAN.

The same author (Griffith<sup>(2)</sup>) deals with tuberculosis in man. On pages 185-186 of the fifth volume of "A System of Bacteriology" appears the following:

**Respiratory.** This is the most frequent avenue of infection. Tubercle bacilli in inspired air may be deposited on the nasal, buccal or pharyngeal mucous membranes, and if absorbed affect the same groups of glands in the neck as ingested bacilli. The nose and mouth are not, however, efficient filters and arrest only the coarser particles. The careful experiments of many observers have shown quite conclusively that fine infective dust or droplets can readily enter the lungs with inspired air and penetrate to their most remote parts . . .

The classical inhalation experiments of Koch (1884), confirmed by numerous other investigators and supported by clinical and post-mortem observations, seemed to leave no room for doubt that the avenue of infection in human thoracic tuberculosis was the respiratory path, and that the vehicle of transmission was the dried or finely divided sputum of phthisical persons. For two decades after the discovery of the tubercle bacillus the doctrine that pul-



monary tuberculosis is an inhalation disease was widely accepted and taught (Bullock, 1909). Opinion was divided in the main as to the exact physical condition of the infective material, whether it was in the form of dust, as believed by Koch, or as moist droplets, as asserted by Flügge (1899) and his school. In 1903, von Behring . . . affirmed his belief in the alimentary origin of pulmonary tuberculosis. He was of the opinion that the infection was acquired in infancy or early childhood through the agency of cow's milk, the bacilli passing through the mucous membrane of the alimentary tract and glands in connection with it directly to the lungs. Behring presupposed both prolonged latency of tubercle bacilli and convertibility of the bovine into the human type in human tissues. Neither of these hypotheses has received confirmation.

Topley and Wilson, in their book on bacteriology and immunity,<sup>(4)</sup> which, on the authority of Professor H. K. Ward, is the best book of today, support the inhalation theory and mention that tubercle bacilli are projected by phthisical patients in the act of coughing usually not further than one and a half metres (roughly five feet). Other observations have shown that bacteria may be projected further by sneezing.

In Osler's "Modern Medicine", Volume I, 1928, Allen K. Krause<sup>(5)</sup> writes on the pathology of tuberculosis, and on page 353 he says:

There can hardly be any doubt that, of the numerous instances of manifest chronic tuberculosis of the lungs, many result from old, very old, foci; enough unexceptionable histories allow no other opinion. At the same time, there is every likelihood that many spring from recent infections; there is frequently more than the "long arm of coincidence" needed to explain the outbreak of pulmonary tuberculosis in a formerly robust adult, soon after his association with an advanced consumptive. What proportion of cases are of early foci become active or of new foci of reinfection, no one may presume to say.

Krause, in addition to writing in Osler's "Modern Medicine", is the editor of the *American Review of Tuberculosis* and should know his work; yet some physicians have "presumed to say" that most cases are of early foci become active.

There is indubitable evidence that pulmonary tuberculosis of adults is due to an exogenous infection and that persons who come into known repeated contact with patients run more risk than members of the general community of contracting the disease.

In *The Lancet* of July 25, 1936,<sup>(6)</sup> and *The British Medical Journal*<sup>(7)</sup> of the same date are reports of the twenty-second annual conference of the National Association for the Prevention of Tuberculosis.

In both journals Sir Arthur MacNalty, Chief Medical Officer of the Ministry of Health, is reported to have said that statistical inquiries made for the Ministry of Health in various parts of the country had shown that the incidence of tuberculosis morbidity and mortality was much greater in a contact population than in the general population.

The excellent work of our own dispensary, which strives to prevent the spread of disease from patient to contact by contagion, is based on this very principle.

Since 1925 the men of Philadelphia have been investigating the problem. They have collected and analysed a vast amount of data. Their work is so thorough and on such a large scale that their conclusions cannot be ignored by those who seek the truth. Their publications appear in the form of reports of the Henry Phipps Institute and are collections of papers which have appeared in various journals. I have the permission of Professor H. K. Ward to say that Dr. Eugene L. Opie, formerly of the Phipps Institute and now of Cornell Medical College, New York, is one of the world's authorities on the pathogenesis of tuberculosis. In the eighteenth report (1925) Opie<sup>(8)</sup> writes on "Widespread Tuberculous Infection of Healthy Individuals and its Significance" ("Conclusions", page 7):

As yet we know very little concerning the conditions under which a preexisting infection protects from a second. It is probable that resistance to reinfection diminishes as healing of the first infection proceeds, so that with complete healing and calcification all or almost all immunity is lost. In consequence a succession of infections may occur during the course of life. The high incidence of fatal tuberculosis during early adult life may be referable to diminishing resistance coincident with complete healing of lesions acquired during childhood. The subject requires further investigation.

#### Marital Tuberculosis.

In the nineteenth report (1927) Opie and F. Maurice McPhedran<sup>(9)</sup> discuss the contagion of tuberculosis ("Marital Tuberculosis", page 376):

Statistical studies of marital tuberculosis have had widely different results, and the possible fallacies in their interpretation have been repeatedly discussed. Some of those who have studied the problem (Fishberg<sup>(10)</sup>) find no evidence of marital infection; but a greater number, for example Barnes,<sup>(11)</sup> have found that tuberculosis occurs more frequently in the consorts of tuberculous individuals than in the general population, although the preponderance is not great. Statistics based upon many thousands of couples have been collected from the literature of the subject and analysed by exact mathematical methods in the well-known study of Pope and Pearson.<sup>(12)</sup> More recently, statistics based upon 53,069 couples, of which husband or wife suffered with tuberculosis, have been collected by Arnould,<sup>(13)</sup> and in 4,472 instances both have been found tuberculous, namely, 8.43 per cent. Arnould reaches the conclusion that there is a definite increase of tuberculosis as the result of marital contact, but it does not exceed by more than half the morbidity of the general population.

In the twentieth report (1928), in the seventeenth Mary Scott Newbold Lecture, page 24, Opie<sup>(10)</sup> says:

Latent tuberculosis of childhood confers immunity against subsequent infection, but resistance is limited and transient. Pulmonary tuberculosis of adults is not derived from the disease of childhood, but is the result of new infection and pursues a chronic course, because some immunity induced by preceding disease still persists.

In the twenty-fourth report (1932-1933), in the form of a reprint from the *Archives of Internal Medicine*, Volume L, December, 1932, pages 945 to 951, Opie and McPhedran<sup>(11)</sup> published a paper on "Exogenous Tuberculous Infection of Adults—Marital Tuberculosis". On page 2 the following table appears:

TABLE I.<sup>1</sup>  
Occurrence of Clinically Manifest Tuberculosis in White Wives and Husbands after its Appearance in the other Marital Partner.

	Number Exposed.	Number not Examined.	Number with Tuberculosis.	Percentage with Tuberculosis, and Probable Error.
Wives exposed to husbands having tuberculosis with:				
Tubercle bacilli in sputum .. .. .	145	45	18	12.4—1.85
No tubercle bacilli in sputum .. .. .	89	33	4	4.5—1.48
Husbands exposed to wives having tuberculosis with:				
Tubercle bacilli in sputum .. .. .	70	37	9	12.9—2.70
No tubercle bacilli in sputum .. .. .	72	47	6	8.3—2.19

<sup>1</sup> After Opie and McPhedran.<sup>(11)</sup>

When the husband first suffered from pulmonary tuberculosis and had tubercle bacilli in his sputum, tuberculosis appeared in the wife in 12.4 per cent. of the cases. When wives first had the disease, manifest pulmonary tuberculosis appeared later in 12.9 per cent. of their husbands. It is, then, known to have occurred with approximately equal frequency in husband or wife when the other partner suffered with open tuberculosis . . . .

[Page 3.] The foregoing figures concerning the incidence of conjugal tuberculosis show how many partners are known to have acquired the disease, but they do not exclude the possibility that the actual number is larger. Of white wives, for example, 234 were exposed to infection by the husband, but of these 78 were not available for examination, and of white husbands a much smaller number presented themselves for examination, so that of 142, more than half, namely 84, were not examined. It is well recognized that not a few persons with symptoms of pulmonary tuberculosis shun examination because they dread being told that they have tuberculosis. Had it been possible to examine all of these persons, additional instances of the disease would have been discovered and the figure representing its incidence would have been increased.

Since latent tuberculosis is unaccompanied by symptoms and unrecognizable by the patient, those with this lesion are no more likely to come to the dispensary for examination than are other persons who have been in contact with tuberculosis. Hence the percentage of latent apical lesions obtained by examination of exposed marital partners with no manifest tuberculosis is equally applicable to those who have failed to report for examination . . . .

[Page 4.] Latent apical tuberculosis, like clinically manifest tuberculosis, was more frequent in husbands than in wives exposed to the disease (Table II). As with manifest pulmonary disease, the relation of the latent apical lesion to infection is shown by its greater frequency and severity in persons exposed to partners with tubercle bacilli in the sputum (Table III). Nevertheless, when the results of examination of the sputum were negative the presence of tubercle bacilli in the sputum obviously cannot be excluded, because the number of examinations varied widely, and it is probable that tubercle bacilli were present in some instances before the period of our observation.

Table II appears on page 3 of Opie and McPhedran's report.

On page 7 of their report Opie and McPhedran give their conclusions:

When roentgenographic methods are used for the recognition of tuberculous lesions of the lungs in husbands and wives in contact with a tuberculous partner, exogenous infection of adults is clearly demonstrable.

Husbands and wives in marital contact with tuberculosis under varying conditions are infected from five to nine times as often as persons with no known contact with the disease; husbands are infected oftener than wives.

The frequency of infection in wives exposed to husbands with tubercle bacilli in the sputum was 35.5 per cent.;

TABLE II.<sup>1</sup>  
Occurrence of Latent Apical Tuberculosis in White Wives and Husbands after the Appearance of Tuberculosis in the other Marital Partner.

	Number Examined and Found to have No Clinically Manifest Tuberculosis.	Number with Latent Apical Tuberculosis.	Percentage with Latent Apical Tuberculosis.
Wives exposed to husbands having tuberculosis with:			
Tubercle bacilli in sputum ..	82	21	25.6
No tubercle bacilli in sputum ..	62	10	19.2
Husbands exposed to wives having tuberculosis with:			
Tubercle bacilli in sputum ..	24	9	27.5
No tubercle bacilli in sputum ..	19	6	31.6

<sup>1</sup> After Opie and McPhedran.

in those exposed to husbands with no demonstrable tubercle bacilli, 22.9 per cent. The incidence of infection in husbands exposed to wives with open tuberculosis was 45.6 per cent., and when there were no tubercle bacilli in the sputum it was 35.9 per cent.

When the incidence of latent apical tuberculosis in persons exposed to tuberculosis in husband or wife is compared with that in husbands or wives with no known exposure to tuberculosis, the possibility that the difference has occurred by chance is negligible.

The findings of Opie in regard to conjugal tuberculosis have been confirmed in England.

In *The Lancet* of February 17, 1934, Volume I, pages 363 to 367, is an article on the prevention of tuberculosis by Sir Arthur MacNalty,<sup>(12)</sup> Senior Medical Officer for Tuberculosis of the Ministry of Health, who says, at page 364:

Inter-conjugal infection has been much discussed. A. J. Scott Pinchin investigated the histories of 166 married couples on the Hampstead Dispensary register and found that in 38.5 per cent. of them infection had probably been passed from one partner to the other. He concludes that marital infection is more common than is generally supposed, but that in a large number of instances the infection is benign.

You all know that the Australian Mutual Provident Society reduces all probabilities to the form of hard cash. If the wife of the proponent has suffered from phthisis within two years he is loaded three years; if the husband of the proponent has so suffered she is loaded five years.



## Infection of Medical Students.

In *Archives of Internal Medicine*, Volume XLVIII, Part I, Number 5, November, 1931, pages 734 to 742, Hetherington, McPhedran, Landis and Opie<sup>(12)</sup> publish the results of their examinations of 279 pre-medical college students and of 452 medical students compared with similar examinations of boys attending high school:

In the *Harvard Medical School Alumni Bulletin*, Steidl commented on the frequency with which medical students, young physicians and nurses are found among the patients of sanatoriums for tuberculosis, and in the same number of this publication an editorial states that the toll of tuberculosis among students of the Harvard Medical School has been appalling. In the class of 1924, 10 men, or nearly 10 per cent. of the class, became ill from tuberculosis during their course in the medical school or during their subsequent hospital work. Nevertheless, Fitz has found little evidence of tuberculosis among 417 medical students of Harvard Medical School to whom he gave roentgenologic examinations . . . .

**Summary.**—Examinations to discover the frequency of tuberculous infection were made of 279 premedical college students, and of 452 medical students and were compared with similar examinations of boys attending high school.

Tuberculous infection indicated by the tuberculin test increased with age, occurring in 77.8 per cent. of the high school boys, in great part between the ages of 15 and 18 years, in 85.6 per cent. of the premedical college students, largely between the ages of 16 and 21 years, and in 93.6 per cent. of the medical students, largely between the ages of 21 and 26 years.

The frequency of recognizable calcified nodules in the lungs and lymph nodes did not differ notably in high school boys, in premedical college students and in medical students.

Tuberculous infiltrations at the apex of the lungs were somewhat more frequent in premedical students than in high school boys and had not increased notably in students of the first year of medicine (4.1 per cent.). In medical students they increased rapidly from year to year, being 11.6 per cent. in second year students, 14 per cent. in third year students and 20.5 per cent. in fourth year students. Moreover, the frequency of advanced lesions increased at the same time, 13 students in the fourth year having lesions extending from the apex below the clavicle.

Tuberculous infiltration of the apex of the lungs accompanied by symptoms or physical signs, that is, manifest pulmonary tuberculosis, occurred once among the premedical students examined, once during the first two years of medicine, four times in the third year class in medicine and nine times in the fourth year class.

An increasing frequency of grave infection during adolescence and early adult life is evident, but there are available no comparable data concerning the occurrence of tuberculosis in young men pursuing other occupations and presumably in good health. Nevertheless, the high incidence of apical lesions in these medical students, increasing rapidly from the ages of 21 to 26, indicates that they were peculiarly subject to advanced tuberculous infection.

A further study by the same authors is published in the twenty-sixth report of the Henry Phipps Institute, reprinted from *Archives of Internal Medicine*, Volume LV, May, 1935, pages 709 to 734.<sup>(13)</sup>

In this they record the investigation of 521 medical students, 128 dental students and 83 law students. The incidence of positive reaction to tuberculin was high in all students, approximating 100% in graduating classes. The incidence of tuberculous lesions at the apex of the lung, demonstrated in X ray films, was from 15% to 20% in four graduating medical classes, including, in all, 521 students. The more advanced infiltrations, situated

both above and below the clavicle, and sometimes producing symptoms or physical signs, occurred in 11.5% of the graduating medical class of 1930, in 6% of the class of 1931, in 5.3% of the class of 1932, and in 8.3% of the class of 1933. Corresponding figures for graduating dental and law students were 2.2% and 2.4% respectively.

## The Infection of Contacts.

Comparison of the incidence of tuberculous lesions in a small number of dental and law students with those in medical students shows that apical disease was about twice as frequent in the medical students and that the more advanced apical lesions occurred much more frequently among them.

Also in the twenty-sixth report, Opie and McPhedran,<sup>(13)</sup> in Studies Numbers 1 and 2, and the same authors with Putnam in Study Number 3, publish as a reprint from the *American Journal of Hygiene*, Volume XXII, Number 3, 1935, their observations of 5,417 persons who were members of households or families, divided into four groups, namely, families with one or more cases of tuberculosis with tubercle bacilli in the sputum, with tuberculosis with no tubercle bacilli in the sputum, with suspected tuberculosis, or with no tuberculosis. Some of their results are shown in the graphs, to which I draw attention (Figures I to VI).

During their investigations the numbers of radiological examinations made were as follows:

Members of families with tuberculosis and tubercle bacilli in sputum . . . . .	1,633
Members of families with tuberculosis and no tubercle bacilli in sputum . . . . .	951
Members of families with suspected tuberculosis . . . . .	402
Members of families with no tuberculosis . . . . .	734
Total . . . . .	3,720

Opie and McPhedran's conclusions (page 681) are as follows:

Since in persons first exposed to tuberculosis after 15 years of age the frequency of infection, like that of early childhood under corresponding conditions, increases rapidly and far exceeds that of the general population, the adult type of pulmonary tuberculosis is evidently acquired by contact. This pulmonary tuberculosis of adult type is not the continuation of tuberculosis of childhood, but is an exogenous infection acquired in adolescence or adult life.

Further evidence of the occurrence of exogenous infection in adult life is obtained by comparing mortality following exposure to tuberculosis with that of the general population. It increases continuously when exposure begins after 15 years of age, just as it does after exposure at an earlier age and reaches a rate far in excess of the maximum death rate from tuberculosis in the general population.

The relation of infection to exposure both in young children and in adolescents and adults is well shown by the results of contact with tuberculosis with tubercle bacilli in the sputum on the one hand and with tuberculosis with no discovered dissemination of tubercle bacilli on the other. In both age groups the frequency of infection is much greater in contacts with open tuberculosis. The severity of the disease in adolescents and adults, as in young children, varies with the number of tubercle bacilli in the environment because infection is exogenous.

## The Infection of Nurses.

Proponents exposed to more than the usual risks of infection are loaded three or five years by the Australian Mutual Provident Society.

In *The Canadian Medical Association Journal*, New Series, Volume XXII, March, 1930, E. L. Ross,<sup>(14)</sup> Assistant Superintendent, Manitoba Sanatorium, publishes his prize essay of the Canadian

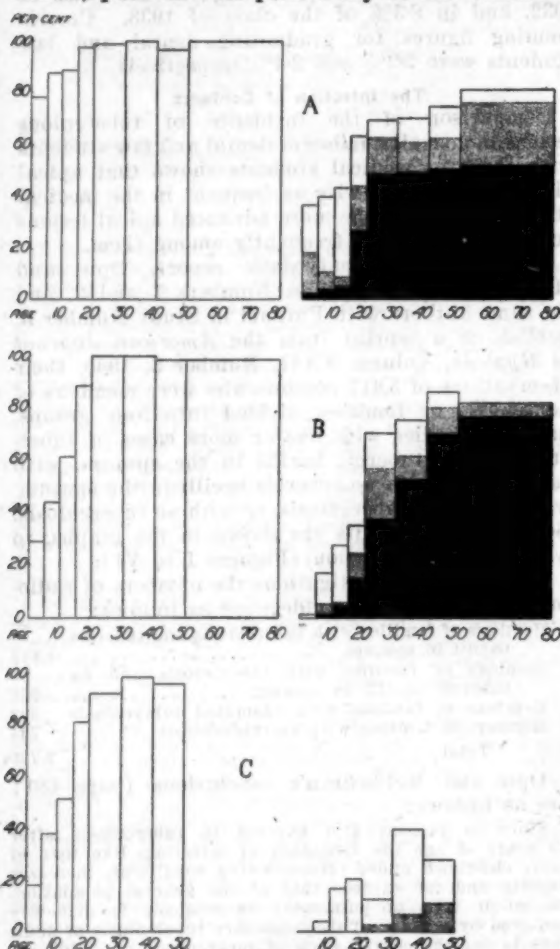


FIGURE I.

The percentage of persons reacting to tuberculin (A) in families with tuberculosis with tubercle bacilli in the sputum, (B) in families with tuberculosis with no known tubercle bacilli in the sputum, and (C) in families with no tuberculosis, compared with the percentage of lesions recognizable by X ray examination. Lesions recognized radiographically are divided into (i) clinically manifest tuberculosis (solid black), (ii) latent infiltrating lesions, including those of both childhood and adult type (shaded), and (iii) calcified nodules (with no shading). (After Opie and McPhedran.)

Tuberculosis Association. The paper was based on a study of tuberculosis in sixty nurses admitted to or examined at the sanatorium within five years.

He concludes that this is far beyond the proportion in which women of the Province in general, or any other class of women in the Province, have been admitted, and more than the proportion of girls of their average age also.

In the *Archives of Internal Medicine*, Volume XLI, 1928, Johannes Heimbeck,<sup>(15)</sup> of Oslo, Norway, publishes a paper on "Immunity to Tuberculosis". He records an investigation into the subject of

tuberculosis in nurses at Ullevaal training school. In the 1934 group 58 nurses gave a positive reaction to the von Pirquet test and none of these developed

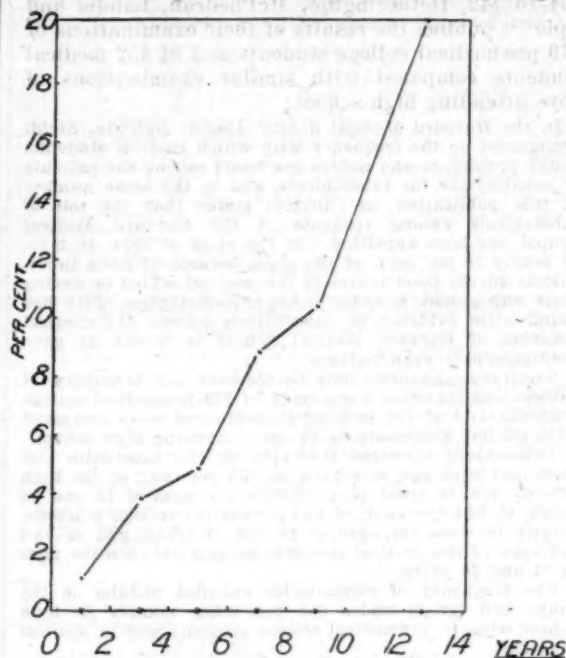


FIGURE II.

Mean frequency of clinically manifest tuberculosis in white persons by years following (a) exposure to tuberculosis with tubercle bacilli in the sputum (shown thus —•—), and (b) exposure to tuberculosis with no known tubercle bacilli in the sputum (shown thus —x—), beginning between ten and fourteen years of age. (After Opie and McPhedran.)

tuberculosis; but 51 gave no reaction and 13 of these developed tuberculosis (11.9%). In the 1925 class there were 42 reactors with three cases,

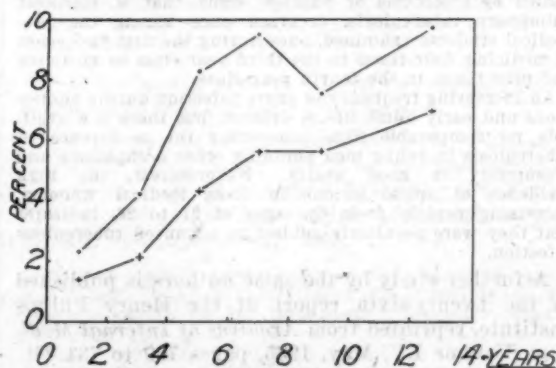


FIGURE III.

Mean frequency of clinically manifest tuberculosis in white persons following (a) exposure to tuberculosis with tubercle bacilli in the sputum (shown thus —•—), and (b) exposure to tuberculosis with no known tubercle bacilli in the sputum (shown thus —x—), beginning after fifteen years of age. (After Opie and McPhedran.)

and 72 non-reactors with 17 cases (17.5%). In 1926 there were 52 reactors with one case, and 62 non-reactors with 14 cases (13.1%); in 1927, 48 reactors with no case and 35 non-reactors. Of the



35, 23 were inoculated with *Bacille Calmette-Guérin* and none developed tuberculosis, and of 12 who were not inoculated four developed the disease (4.8% of all the nurses of the year).

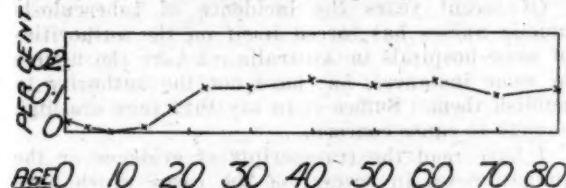


FIGURE IV.

Age specific death rates from tuberculosis in Philadelphia, 1920. (After Opie and McPhedran.)

In *The Journal of the American Medical Association*, Volume CIV, Number 21, May 25, 1935, page 1925, C. A. Stewart,<sup>(16)</sup> of Minneapolis, addresses a

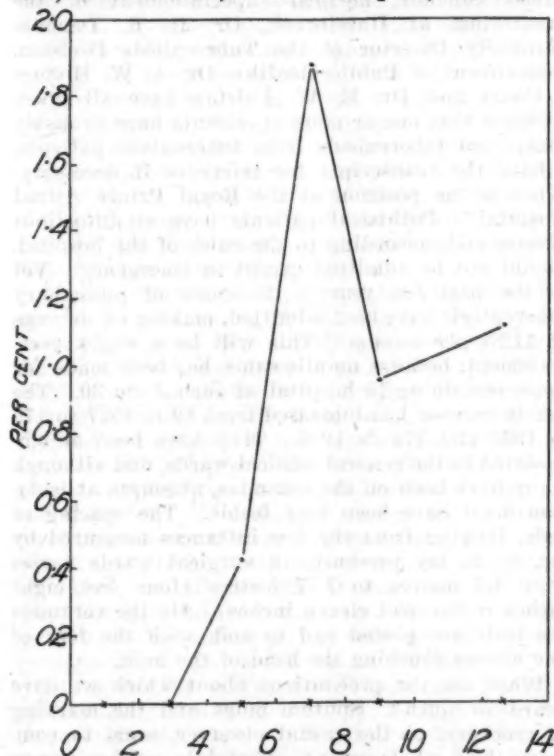


FIGURE V.

Annual death rate from tuberculosis in white persons following (a) exposure to tuberculosis with tubercle bacilli in the sputum (shown thus —), and (b) exposure to tuberculosis with no known tubercle bacilli in the sputum (shown thus —x—), beginning between ten and fourteen years of age. (After Opie and McPhedran.)

letter to the editor on the subject of "Infection of Nurses with Tuberculosis". He writes:

The communication of Dr. H. J. Ustvedt in the *Journal*, March 9, page 851, touches several important problems. The nurses who enter the Ullevaal Hospital in Oslo with negative tuberculin reactions are all apparently infected with tubercle bacilli during a three-year period of training. This experience, combined with the additional observation that in this interval 4.8 and 34.6 per cent. of the nurses who entered the institution with positive and negative tuberculin reactions respectively, developed clinical tuber-

culosis, illustrates the need for the routine observance of strict contagious technic by all who are attending tuberculous patients. Violations of basic principles of communicable disease control by the staffs of hospitals retard the programs designed to eradicate tuberculosis.

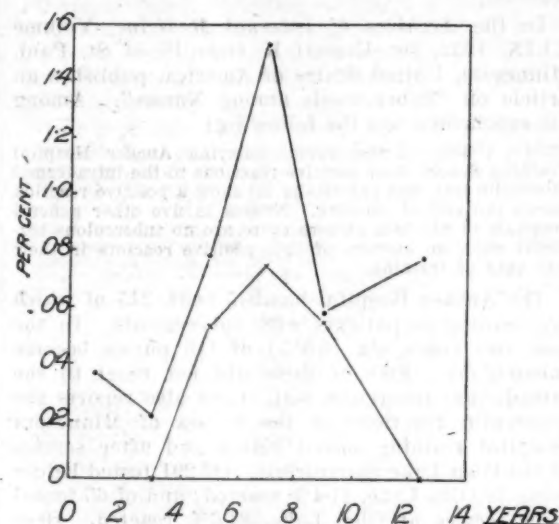


FIGURE VI.

Annual death rate from tuberculosis in white persons following (a) exposure to tuberculosis with tubercle bacilli in the sputum (shown thus —), and (b) exposure to tuberculosis with no known tubercle bacilli in the sputum (shown thus —x—), beginning after fifteen years of age. (After Opie and McPhedran.)

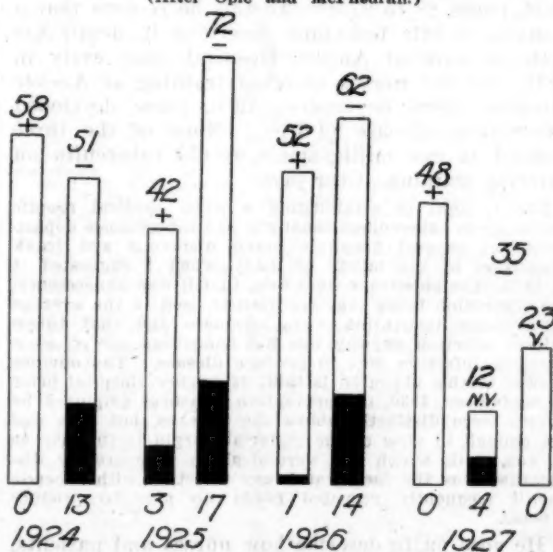


FIGURE VII.

Pupil nurses grouped according to von Pirquet reaction, showing the incidence of tuberculosis. Numerals at the top of the columns indicate the number of nurses in each group. Reaction to the von Pirquet test, +; no reaction, —, N.Y. in column eight shows number not inoculated; V. in column nine, number inoculated with *Bacille Calmette-Guérin*. Numerals at the bottom of columns indicate the number of cases of tuberculosis that developed in each group. Numerals 1924, 1925, 1926 and 1927 indicate the year each group of nurses began training. (After Johannes Heimbeck.<sup>17</sup>)

<sup>17</sup> . . . It is important to point out that a high proportion of Heimbeck's tuberculous nurses were suffering from erythema nodosum." (Topley and Wilson, 1936, page 1046.)

This situation, prevalent doubtless in hospitals throughout the world, merits immediate correction under the leadership of the medical profession; otherwise a penalty in the form of new cases of clinical tuberculosis of institutional origin continues to be paid for permitting infection to occur.

In the *Archives of Internal Medicine*, Volume XLIX, 1932, Dr. Everett K. Geer,<sup>(17)</sup> of St. Paul, Minnesota, United States of America, publishes an article on "Tuberculosis among Nurses". Among his conclusions are the following:

... 30% of the nurses entering Ancker Hospital Training School show positive reactions to the intradermal tuberculin test, and practically all show a positive reaction before the end of training. Nurses in five other general hospitals in St. Paul (where there are no tuberculous services) show an average of 42% positive reactors in their last year of training.

The Ancker Hospital has 975 beds, 215 of which are devoted to patients with tuberculosis. In the past two years, six (5.5%) of 110 nurses became tuberculous. Five of these did not react to the intradermal tuberculin test. Geer also reports the tuberculin reactions of the nurses of Minnesota Hospital training school before and after service at the Glen Lake Sanatorium. Of 291 tested before going to Glen Lake, 47.4% reacted; and of 65 tested after service at Glen Lake, 84.6% reacted. Geer makes several suggestions for the prevention of the disease.

The sequel to his paper is published in the *American Review of Tuberculosis*, Volume XXIX, 1934, pages 88 to 97.<sup>(18)</sup> In this he reports that a medical aseptic technique described in detail has been in force at Ancker Hospital since early in 1931. Of 181 nurses entering training at Ancker Hospital from September, 1930, three developed tuberculous disease (1.6%). None of the three reacted to one milligramme of old tuberculin on entering training. Geer says:

The thought of establishing a strict medical aseptic technique in tuberculous sanatoria and tuberculosis departments of general hospitals found disfavour and frank opposition in the minds of many when I suggested it in 1930. The objections were first, that it was unnecessary, the contention being that precautions used in the average tuberculosis institution were adequate and that tuberculosis infection anyway was not dangerous *per se*, as it required infection *plus* to produce disease. The obvious answer to this objection is that, at Ancker Hospital prior to September, 1930, the preventive measures employed by nurses were distinctly above the average, but this was not enough in view of the material, virgin to tubercle as it was, with which we were dealing. Apparently disregarded was the fact that heavy infection with tubercle bacilli frequently repeated needs no *plus* to produce disease.

He goes on to describe how nurses and patients, far from being scared by the extra precautions, were cooperative and enthusiastic. He asks:

Does it not seem strange in a year when our slogan is *Tuberculosis causes Tuberculosis* that there should even be one dissenting voice toward an appeal, supported by an increasing volume of evidence, for more adequate protection against frequent and massive infection with the tubercle bacillus among our medical students, internes, nurses, and other hospital employees? And does this not seem more strange in the light of our present knowledge which teaches us that the only proved factor without which one cannot develop tuberculous disease is tuberculous infection?

Among the precautions mentioned by Geer are the wearing of gowns, caps, covering the hair, and masks.

#### *Nurses in Australia.*

Of recent years the incidence of tuberculosis among nurses has forced itself on the authorities of some hospitals in Australia. I have the figures of some instances, but have not the authority to publish them. Suffice it to say that they are high enough to cause concern.

I have read the transcripts of evidence or the judge's notes in several of the cases which have been heard by the Workers' Compensation Commission; but I do not propose to read what various medical men have said. I merely mention that Sir Charles Blackburn, Dr. Cotter Harvey, Dr. H. O. Lethbridge, of Narrandera, Dr. A. J. Collins, Dr. James Sinclair, medical superintendent of the sanatorium at Hazelbrook, Dr. H. K. Denham (formerly Director of the Tuberculosis Division, Department of Public Health), Dr. A. W. Holmes à Court and Dr. E. W. Fairfax have all given evidence that one or more applicants have probably contracted tuberculosis from tuberculous patients. I have the transcripts for reference if necessary. What is the position at the Royal Prince Alfred Hospital? Phthisical patients have an infectious disease and, according to the rules of the hospital, should not be admitted except in emergency. Yet in the past ten years 1,125 cases of pulmonary tuberculosis have been admitted, making an average of 112.5 *per annum*. This will be a slight overstatement, because no allowance has been made for those remaining in hospital at each June 30. The yearly number has increased from 89 in 1927 to 170 in 1935 and 174 in 1936. They have been accommodated in the general medical wards, and although many have been on the verandas, attempts at isolation must have been very feeble. The spacing of beds, judging from the few instances measured by me, or in my presence, in surgical wards varies from 1.4 metres to 1.77 metres (four feet eight inches to five feet eleven inches). On the verandas the beds are placed end to end, with the foot of one almost touching the head of the next.

What are the precautions about which we have heard so much? Sputum mugs and the marking of crockery, to the casual observer, seem to comprise their whole extent. Certainly neither gowns nor masks have been worn. Surely it would be wise to have a special building, with arrangements for the admission of direct sunlight, and a space of eight or nine feet between beds. The out-patient dispensary could be housed in such a building.

In *The Lancet*, Volume II, 1933, page 1226, J. Alison Glover,<sup>(20)</sup> Deputy Senior Medical Officer of the Ministry of Health, in an article on preventable diseases of school children, refers to the nine-foot interval between beds, which is the minimum standard of the Ministry of Health for infectious diseases hospitals.

The adoption of real precautions, of the type advocated by Geer, by all who come in contact with patients could do no harm and might do much good.



Would it not be wise to employ only senior nurses over the age of thirty who give a positive response to the Mantoux test?

Opie and McPhedran,<sup>(13)</sup> in the twenty-sixth report of the Henry Phipps Institute (*American Journal of Hygiene*, Volume XXII, Number 3, November, 1935), at page 595, say: "A negative tuberculin reaction is evidence that there is no existing tuberculous infection, since only 1 of 577 persons who failed to react had a lesion that was not calcified and presumably healed or healing."

If you compare the precautions taken with cases of diphtheria with those omitted in tuberculosis, it is difficult to understand the logic of man. In diphtheria, many of the exposed can never suffer the disease, yet, wisely I think, precautions are taken. The disease is early in onset and curable in most instances. In tuberculosis the disease is insidious and usually chronic, and treatment is very difficult. Which disease would any medical man choose were he compelled to have one or the other?

Why on earth more precautions with regard to tuberculosis are not taken is a question beyond comprehension. The possible spread of infection with the tubercle bacilli of these patients is an unknown quantity, because no evidence has been sought at the Royal Prince Alfred Hospital.

The incidence of actual disease possibly due to contact with the patients is almost unknown at the Royal Prince Alfred Hospital.

It was reported to the committee that there had been six cases among the nurses in fifteen years, and two of these were rightly excluded; but at the time no search had been made of the records. I understand that since the committee met a search has been made for the past ten years and that the known incidence is very small. The figures will be a record of nurses who have contracted tuberculosis and have been also admitted as patients to this hospital. No account has been taken of any nurse who became ill and went to her home or to another hospital. There is no record of any nurses in whom the disease has become manifest after they left hospital. In any case, the only reliable method is by means of a radiographic survey, because the disease is slow in developing.

To my own knowledge, two definite cases of tuberculosis have been discovered by X rays since the recent introduction of X ray examination of applicants to the training school. The recent increase in the number of admissions must mean an increased risk.

We all know that occasionally a student or resident medical officer goes down with tuberculosis. How often has this happened? Is there any tally?

What of the patients who have occupied neighbouring beds? No attempt has been made to trace them.

Would any physician who subscribes to the childhood infection theory allow his own adult offspring to sleep in the bed next to that occupied by a patient with open tuberculosis? Would he, relying on the entirely unknown degree of natural

or acquired resistance, allow his own young daughter to nurse cases of open tuberculosis? Or would he take into his own home as a servant, however efficient, a woman known to be tuberculous?

I heard one physician say that we must avoid raising a scare. On the contrary, I would raise such a cry as would make government and health authorities realize that a disease exists which can and should be abolished. Money is lavished on less laudable objects.

Let each one talk of facts and not of fancies. Let each hospital protect its nurses by all reasonable means.

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# ADDENDUM.

Topley and Wilson's 1936 edition arrived while this paper was in the press. On page 1048 they say: "There has in the past been a great tendency to overlook the fact that tuberculosis is an infectious disease. Little or no attempt has been made to protect nurses, medical students, and doctors against the unduly high risk of infection that practice of their profession entails, with the result that the incidence of tuberculosis has been unnecessarily high among these classes of the population . . ."

## Reports of Cases.

### REMOVAL OF AN ACOUSTIC NERVE TUMOUR.

By GILBERT PHILLIPS, M.S., M.Sc. (Sydney),  
Honorary Neurological Surgeon, Lewisham Hospital.  
(From the Department of Surgery,  
University of Sydney.)

THIS case is of interest and is reported as it presents several features which do not correspond to the classical picture of tumour of the eighth cranial nerve. The patient, a woman, aged forty-four years, was referred to the Department of Neurological Surgery at the Lewisham Hospital by Dr. R. J. Murphy on May 27, 1936. She was a healthy-looking, intelligent, cooperative female, who stated that she had never had any serious illness and that the first symptom of her present condition was tinnitus in the left ear, which had commenced four months before and had persisted continuously up to that time. Two months



FIGURE I.

previously she had noticed that she was becoming deaf in the left ear. During the previous month she had become unsteady on her feet and frequently staggered, chiefly to the left side. On waking in the morning three days previously she had noticed that her face was asymmetrical, the left side of the face drooped, and she had difficulty in closing the left eye. She had had no headaches and had not vomited.

On examination there was no abnormal configuration of the head, head posture was normal, but Rombergism with falling to the left was present. Visual acuity was  $\frac{1}{20}$  in each eye, and although the optic disk edges were not clearly defined, definite papilloedema was not present. The pupils were circular, central and equal and contracted well on convergence and to direct and consensual light. Nystagmus was present on lateral deviation and was more marked when the eyes were turned to the left. The corneal reflex

was absent on the left side, but there was no disturbance of facial sensation. A complete intranuclear facial palsy was present on the left side. There was marked interference with bone conduction of sound on the left side and Weber's test was referred to the right side. The palate could be elevated in the mid-line and the palatal reflex was present on each side.

There was some general hypotonia, but no disturbance of sensation, motor power or reflex action could be detected in the trunk or extremities. A provisional diagnosis of left acoustic nerve tumour was made and the patient was admitted to hospital.

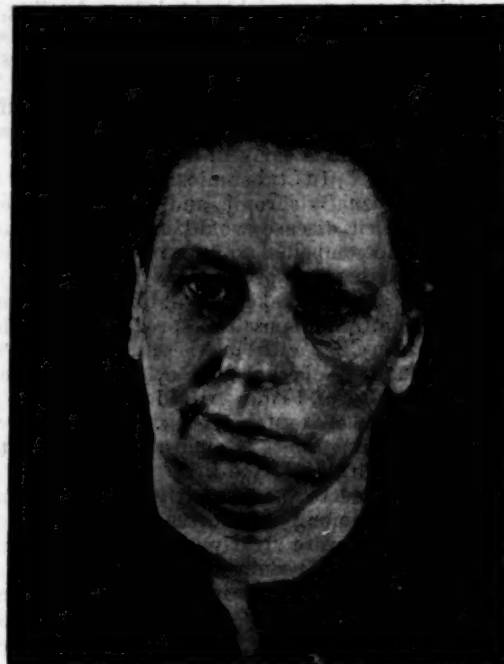


FIGURE II.

On May 30, 1936, irrigation of the right external auditory meatus with water at 60° F. produced nystagmus in forty-five seconds, whereas on the left side no nystagmus was elicited after irrigation for four minutes.

On June 2, 1936, a radiogram in the Towns position disclosed no erosion of the left internal auditory meatus.

On June 3, 1936, Dr. E. A. Brearley reported, in consultation, that the appearances of the optic disks were consistent with those of early papilloedema.

On June 7, 1936, the patient first complained of frontal and occipital headaches.

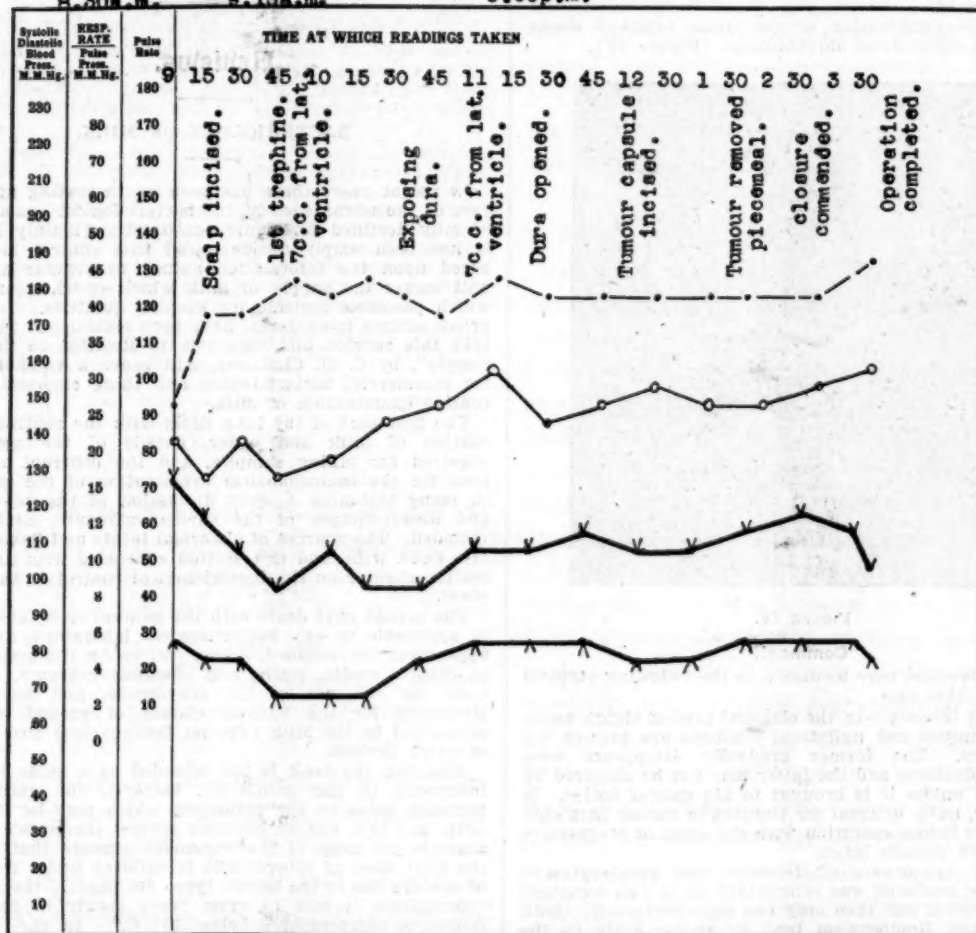
Operation was performed on June 9, 1936. Dr. H. J. Daly induced anaesthesia with a basal dose of "Avertin", and during the operation nitrous oxide was given by the intratracheal route. The total time of the operation was six and a half hours (Figure III). With the patient in the face down position, a suboccipital skin muscle flap was reflected, the arch of the atlas was removed, the posterior edge of the *foramen magnum* was removed with a rongeur and the occipital bone was removed on the left side as far laterally as the mastoid air cells. There was some herniation of the cerebellar tonsils through the *foramen magnum*. The dura was then incised and reflected, and as this was done yellowish cystic fluid containing glistening crystals was seen flowing into the *cisterna magna*. On retraction of the left cerebellar hemisphere a large cystic and solid tumour apparently arising from the acoustic nerve was seen in the left cerebello-pontine angle. The tumour appeared to be about four centimetres in length. The cystic portion



of the tumour forming a cap on the posterior aspect was evacuated (about five to ten cubic centimetres of fluid), and the solid portion of the growth was then seen to be encapsulated with the left facial nerve stretched out to a

internal auditory artery was encountered at the *porus acusticus internus*. A muscle graft was implanted there and the hæmorrhage was thus controlled. The anterior wall of the tumour capsule had to be left *in situ* with the eighth,

Name P.M. Ward B Age 44 Date of Operation 9-6-36  
 Lungs normal Heart normal  
 Urine N.A.D. Blood Pressure 135/90 Rectal Temperature \_\_\_\_\_  
 Operator Gilbert Phillips 1st Assist Macintosh Preliminary Drugs Avertin; atropine.  
 Operation Craniotomy Anæsthetic N2O; Ether. Amount Ether 3 oz.  
Avertin 60 c.c.; Atr. 1/100 Method of Administration Endotracheal.  
 Time of starting anæsth., beginning of op., removal of anæsth., and close of op., to be recorded on chart.  
8.30 a.m. 9.15 a.m. 3.30 p.m.



CODE: ● PULSE RATE; ○ RESPIRATION RATE; v SYSTOLIC AND DIASTOLIC BLOOD PRESS.; x PULSE PRESS.

Induction: Larynx cocaineised; Avertin P.R.; Endotracheal N2O and Ether.

Subsequent anæsthesia: 80 c.c. 1% Novocaine for scalp infiltration.

Condition on leaving operating room: GOOD

Drains 1 Gutta serena.

Anæsthetist H.J. Daly.

Note:—An anæsthesia chart must be completed on all cases operated upon, local anæsthesia cases included.

FIGURE III.

length of 2.0 to 2.5 centimetres over its upper pole. The capsule was incised and the whole of the contents scooped out with the endothermy loop and pituitary rongeurs. In removing the capsule a sharp hæmorrhage from the

rinth, tenth and eleventh cranial nerves passing outwards from its lateral margin. The facial nerve was seen thinned out and hanging slackly in the space previously occupied by the tumour.

The suboccipital flap was resutured and a gutta-percha tissue drain was led from the left cerebello-pontine angle to the skin surface. A starch-plaster cast was applied and the patient was returned to the ward in good condition. Fifteen minutes later she was conscious and responded well to questions. A hypodermic injection of morphine, 0.91 gramme (one-sixth of a grain), was exhibited. Convalescence was uneventful; the patient was swallowing well twelve hours after operation and the gutta-percha drain was removed thirty-six hours after operation (Figure I).

Spontaneous nystagmus to the right took place for some hours after the operation and the left facial weakness has persisted up to the present (Figure II). Since operation the patient has not vomited and has not complained of headache. Papilloedema has subsided and Rombergism has disappeared.

Microscopic examination of the tissue removed shows that it is a perineurial fibroblastoma (Figure IV).

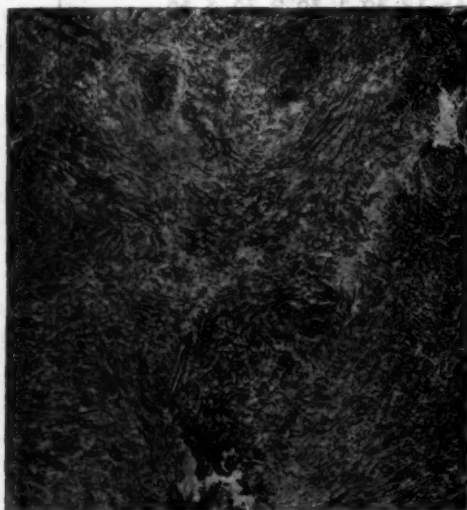


FIGURE IV.

#### Comment.

Special attention may be drawn to the following atypical features of this case.

**The Short History.**—In the classical case of eighth nerve tumour, tinnitus and unilateral deafness are present for many years. The former gradually disappears with increasing deafness and the latter may not be observed by the patient unless it is brought to his special notice. It is, however, quite unusual for tinnitus to appear first only four months before operation with the onset of progressive deafness two months later.

**The Late Appearance of Headache and Rombergism.**—In this case headache was complained of on two occasions before operation and then only two days previously. Both headache and Rombergism tend to appear early in the history of a patient suffering from a tumour in the posterior cranial fossa. It is noteworthy too that vomiting, also an early symptom in many cases of posterior fossa tumour, did not occur in this case either before or after operation.

**The Rapid Appearance of Facial Paralysis.**—The precipitate onset of facial palsy is most unusual. Motor nerves cease to conduct impulses when they are stretched, but recover their conducting power when tension is removed. In the case reported here the facial nerve appears to have accommodated itself to very slowly increasing tension for some time. It does not seem unlikely that the precipitate onset of paralysis in a nerve which has been stretched excessively prefigures some form of permanent injury to nerve fibres if not actual rupture of some of them.

**The Semi-Cystic Nature of the Growth.**—Perineurial fibroblastomata of the acoustic nerve are usually solid tumours. Cushing<sup>6</sup>, Cairns<sup>7</sup> and other authors have called attention to the obstructive distension of the lateral subarachnoid cistern which occurs with tumours of the *nervus acusticus*. In only thirteen out of twenty-four of Cushing's cases, however, was a cystic cap recorded on the posterior aspect of the growth.

#### References.

<sup>6</sup> Harvey Cushing: "Tumours of the Nervus Acusticus, and the Syndrome of the Cerebello-Pontine Angle", 1917.

<sup>7</sup> Hugh Cairns: "On Conserving the Facial Nerve during Removal of Tumours of the Cerebello-Pontine Angle", *Proceedings of the Royal Society of Medicine*, Volume XXV, November, 1931.

## Reviews.

### BACTERIOLOGY OF MILK.

In recent years there has been an increasing appreciation of the advantages of the bacteriological examination of milk destined for liquid consumption, mainly because it has been amply demonstrated that control measures based upon the information gained by regular analyses will insure the supply of milk which is wholesome and which possesses satisfactory keeping qualities. In many urban centres laboratories have been established to undertake this service, and "Bacteria in Relation to the Milk Supply", by C. H. Chalmers, will prove a valuable book for commercial bacteriologists and those engaged in the routine examination of milk.

The first part of the book deals with the routine examination of milk and, water, details of the apparatus required for taking samples, and the different methods used for the bacteriological examination of the samples; in many instances a short discussion of the advantages and disadvantages of the various standard methods is included. The sources of abnormal taints and flavours are also dealt with, and this section concludes with an informative chapter on the bacteriological control of the dairy plant.

The second part deals with the general technique which is applicable to any bacteriological laboratory, and four appendices are included, giving recipes for the preparation of culture media, stains and chemical reagents, instructions for the use of the microscope, and finally the standards for the various classes of graded milk as prescribed by the Milk (Special Designation) Order, 1923, of Great Britain.

Although the book is not intended as a guide to those interested in the pathogenic bacteria, the author has included notes on the pathogens which may be found in milk, and this section contains several inaccuracies. For example, on page 74 the statement appears that 10% of the fatal cases of tuberculosis in children under five years of age are due to the bovine type. On page 75 the *Bacillus tuberculosis* is said to grow "very slowly in raw milk cooled to temperatures below 15° C." In the light of recent work on *Streptococcus agalactiae*, the description of this organism on page 79 is incorrect.

It is very doubtful whether phenols or cresols (page 102) should be recommended at all for use as disinfectants in the dairy. Several misprints of little significance appear in the book, but these should be corrected in future editions; for example, page 133, "infected" for "injected", and page 98, "Ridial-Walker" for "Rideal-Walker". The use of the term "hydrolysis of blood" to describe haemolysis (page 145) is questionable.

<sup>1</sup> "Bacteria in Relation to the Milk Supply: A Practical Guide for the Commercial Bacteriologist", by C. H. Chalmers, B.Sc., N.D.A., with a foreword by A. T. R. Mattick, B.Sc., Ph.D.; 1935. London: Edward Arnold and Company. Crown 8vo, pp. 204, with illustrations. Price: 6s. net.



## The Medical Journal of Australia

SATURDAY, NOVEMBER 14, 1936.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

### NUTRITION.

DURING the last year or two the nutrition of the peoples of the earth has engaged the attention of investigators in most civilized countries; and on more than one occasion during the last twelve months the subject has been mentioned in this journal. In February last the attention of readers was drawn to a report by Burnet and Ackroyd on nutrition and the public health, issued by the League of Nations in the *Quarterly Bulletin of the Health Organization*. After the publication of Burnet and Ackroyd's report the Assembly of the League of Nations discussed the problem of nutrition in relation to the public health on the one hand and to economic and social organization on the other. The subject was then considered in committee by twenty delegations in a debate that extended over three days. It was suggested that the Health Organization of the League of Nations should continue and extend its work on nutrition in relation to public health and that steps should be taken to collect summaries and publish information on the measures taken in all countries for securing improved nutrition. A comprehensive

report was to have been prepared for the 1936 Assembly, but in the time available it was impossible to cover the ground. An interim report has therefore been issued by what is known as the Mixed Committee on the Problem of Nutrition. On this committee are members of the Technical Commission of the Health Committee and representatives of the International Labour Office and of the International Institute of Agriculture. Together with the interim report of the Mixed Committee several other volumes have appeared.<sup>1</sup> Volume II is a report on the physiological basis of nutrition, drawn up by the Technical Commission of the Health Committee. Volume III deals with nutrition in various countries, and Volume IV with statistics of food production and prices.

Of these three reports the first is the most important. Briefly, the scope of the others is as follows. In the second volume are set out the basic needs of the average adult male and female and also of those associated with special conditions, such as heavy manual labour, pregnancy and lactation. Special attention is given to children, and the requirements of children of varying ages are stated. Among the recommendations it is stated that although a simplified diet may be so constituted from a few protective foods as to be satisfactory, it is a general principle that variety in diet tends to safety, provided it contains a sufficiency of the protective types of food materials. White flour, which is deprived of important nutritive elements in the process of milling, should be decreased in the diet, and lightly milled cereals, and especially potatoes, should be substituted. The consumption of an excessive amount of sugar is to be condemned because it tends to lessen the proportion of protective foods; and milk should form a conspicuous element of the diet at all ages. Fresh vegetables and/or fruit should always be constituents of the normal mixed diet, and whenever sunshine is not abundant extra vitamin D should be provided,

<sup>1</sup> "League of Nations Publications: The Problem of Nutrition". Volumes I, II, III and IV; 1936. Geneva: The League of Nations Publications Department; Sydney: H. A. Goddard Limited. Volume I: Interim Report of the Mixed Committee on the Problem of Nutrition. Royal 8vo, pp. 98. Price: 2s. 6d. net. Volume II: Report on the Physiological Bases of Nutrition. Royal 8vo, pp. 27. Price: 8d. Volume III: Nutrition in Various Countries. Royal 8vo, pp. 271. Price: 7s. net. Volume IV: Statistics of Food Production, Consumption and Prices. Demy 4to, pp. 109. Price: 3s. 9d. net.

especially during the period of growth and during pregnancy. The problems requiring further study are: (i) the assessment of the nutritional state of children; (ii) nutritive food requirements during the first year of life; (iii) minimum vitamin and mineral requirements; (iv) minimum fat requirements; (v) the nutritive and "supplementary" values of the different protein-containing foods, to determine to what extent and in what forms animal protein is necessary for growth and health; (vi) the relative nutritive value of different cereals according to the degree of milling; (vii) the extent to which the increasing consumption of sugar is detrimental to health; (viii) the influence of climate on food requirements; (ix) the extent to which diets in common use fall below the standards recommended in the report; (x) the optimum amounts of milk required at different ages. In the third volume, that dealing with the nutrition in various countries, it is pointed out that in certain countries, like the United Kingdom, France, Switzerland and the Netherlands, general food shortage is not likely to arise. In these countries the nutrition problem for the majority of the population, though at first one of income, is in the main a problem of quality, balance of diet, hygiene and education. In other countries the necessity for providing means of subsistence for distressed sections of the population is the chief purpose of endeavour. The fourth volume is a "purely provisional and preliminary" document. It is a study by the International Institute of Agriculture at Rome of available statistics on the production, consumption and prices of the chief protective and other foodstuffs; the data are woefully incomplete. Reference is also made to the financial assistance given to agriculture in some of the principal agricultural countries. The first volume, the report proper, shows that the problem is as much economic as it is medical. First of all, man needs to know what food he should eat and then he must have available supplies and enough money to pay for what he requires. This brings us back to the conception of sociological medicine described by Dr. René Sand as the art of prevention and cure considered in its scientific basis and in its individual

and collective applications from the point of view of the reciprocal relations which connect the health of man with his living conditions. (See THE MEDICAL JOURNAL OF AUSTRALIA, April 25, 1936, page 579.) The whole subject is, of course, beset with difficulties. It is easy to state that in no country does the whole population attain the standard scientifically described in the interests of health. It is equally easy to assert that every man, woman and child in the community should have sufficient money to purchase food regarded in the light of present knowledge as essential to health. The distribution of wealth, the control of prices and the making available of food are questions too large for discussion at present; they are mentioned in the report. There is no doubt that as things are in Australia, that is, without any great economic upheaval, better conditions could be brought about by efficient organization, particularly in the matter of food distribution, and costs to the consumer could be reduced. At the same time it must always be remembered that people will eat what they like and not what they should. They must be taught to like the things that are good for them; and that again is not so easy. The recommendations in the report proper are long and cover the whole range of the subject; they will be studied by all who are particularly interested. Our present purpose is to remind readers that what has been and is being done in Australia is part of a world-wide movement and should at least claim their close attention.

### Current Comment.

#### LUMBAR PUNCTURE AND ITS SEQUELÆ.

Nor infrequently during the past five or six years headache following lumbar puncture, its treatment and its causation have been discussed in many medical journals. Schube and Le Drew attracted attention to the use of sedatives as agents for allaying pain after lumbar puncture, and their work, carried out upon 350 patients and under uniform conditions of technique, received respectful attention. The results of Schube and Le Drew went to show that patients who received premedication with "Sodium amytal" and "Sodium ortal" fared far worse, so far as headache went, than the fifty patients in the control group, who were given no



premedication at all. It may be said in truth that no analgesic has yet achieved a noteworthy success in allaying the headache which follows lumbar puncture. Probably the use of a fine needle and its expert handling, the use of a local anæsthetic and the maintenance of a horizontal posture after the operation are the greatest factors in the prevention of the objectionable sequela of severe headache.

The question of possible extradural trauma often enters into diagnosis based upon the consideration of the cerebro-spinal fluid owing to the presence of blood. Is this blood of traumatic origin—the result of damage due to lumbar puncture itself—or does it originate from a subarachnoid hæmorrhage, now for the first time evident? Is it a "bloody tap" or the token of a preexisting subarachnoid bleeding? To settle these questions the outflowing fluid should be collected in three test tubes. In the case of a "bloody tap", the first tube will contain most blood, the second less, and the third least; and all three specimens will tend to clot. But a yellow discoloration in the fluid withdrawn is a clear indication of subarachnoid hæmorrhage. Special investigations, in cases of "bloody tap", are necessary for the estimation of cell and protein content and the calculation of sugar and chlorides whenever the Lange and Wassermann tests are carried out. These methods have been elaborated by Solomon and are of the greatest interest to laboratory workers and to mathematicians.

It will have been evident, then, that extradural damage of some sort is not uncommon during lumbar puncture. With the sole exception of C. N. Pease, who dealt with three cases of the kind in a paper published in 1935, F. J. Milward and J. L. A. Grout seem to have been the first<sup>1</sup> to have noted the changes in the intervertebral disks following the operation. Milward and Grout report their observations upon five patients who, after operations under spinal anæsthesia, continued to complain at intervals of pains in the back and lower limbs. X ray films of the five patients showed clear and progressive changes in one intervertebral joint. All patients complained of these pains, so severe as to prevent their walking or sitting up. In all, the lumbar spine was held rigidly in the flexed posture, and tenderness was present over one or all of the second, third and fourth lumbar vertebrae. One patient suffered from retention of urine, relieved only by the fitting of a plaster extension jacket. The ages of the patients varied between twenty-four and fifty-one years, three of them being males and two females. The operations comprised hæmorrhoidectomy, hysterectomy, pyelolithotomy, ligature of the saphenous vein and appendicectomy. The anæsthetic employed (1 in 1,500 solution of "Percaïne") was injected through the second, third or fourth interspace, a fine needle being used. The subsequent X ray examinations all revealed substantially similar changes—a progressive arthritis

confined to one intervertebral joint, a loss of joint space, rapid progression of the lesion and the formation of new bone binding together the articular edges of adjoining vertebrae. In more than one instance areas of erosion and bone destruction were seen. These features, however, were not common, and suggested lesions mainly affecting the intervertebral disks. The treatment in all cases was fixation of the lumbar spine in extension with an ambulatory plaster jacket.

These findings raise three points for debate. The possibility of an infective origin is ruled out because of the absence of infection elsewhere or of any constitutional upset. The patient upon whom pyelolithotomy was performed was placed in the lateral position and compression of the vertebral bodies from flattening of the lumbar curve was thus prevented. The anæsthetic employed could not have been a causal factor, since pain and incapacity of the same nature followed a lumbar puncture performed in a case of cerebro-spinal meningitis in which no anæsthetic was employed. Our authors believe, and Pease suggests, that the syndrome arises directly from injury to the intervertebral disks, with secondary changes in the vertebral bodies. It has even been suggested that the entering needle may bore a hole through the *annulus fibrosus*, allowing the escape of the nucleus. It is easy to offer speculation upon the matter; when all is said, it is not unlikely that the trauma inflicted upon the *annulus fibrosus* produces an inflammatory reaction with a consequent weakness which permits of the escape of the *nucleus pulposus*. Whatever the cause of these strange sequelæ, the moral of them is that the operation of lumbar puncture is no triviality. It should be performed only for reasons of the highest importance and with due regard for proper technique.

#### GOLD TREATMENT OF RHEUMATOID ARTHRITIS.

WITHIN recent months, in a Sydney hospital, a woman came to the point of death as the result of gold treatment of rheumatoid arthritis. She had been treated with an approved preparation of gold salts, the dosage of which had been carefully controlled. Moreover, the disease itself had shown an astonishing diminution in severity, and the patient, so far as her subjective symptoms went, might almost have been regarded as cured. Suddenly, however, when the period of treatment had reached its end, the patient had a violent renal hæmorrhage of such extent as to render her almost exsanguinated. An attempt at blood transfusion had to be hurriedly abandoned by reason of a fierce hæmorrhage from the median basilic vein. There were other alarming bleedings—into the tissues superficial to the right hip joint and into various fascial planes of the forearms. The body as a whole was spotted with petechiæ, and a blood count showed the red cells to be of the order of two

<sup>1</sup> *The Lancet*, July 25, 1936.

millions per cubic centimetre. The patient happily recovered after a long course of anti-anæmic treatment;<sup>9</sup> but similar alarming events, fortunately few in number, may be found recorded in the pages of certain Continental periodicals. It is well that physicians and physiotherapists should familiarize themselves with the literature of the subject.

That the matter is attracting attention in England is made evident by two articles in a recent number of *The Lancet*, the first by Stanley J. Hartfall and Hugh G. Garland,<sup>1</sup> the second from the pen of G. J. Villiers Crosby.<sup>2</sup> The two former writers employed gold treatment in 374 cases of rheumatoid arthritis. Many of their patients seemed irrevocably condemned to the life of the sofa or the bath-chair, while many others were first seen in the early stages of the disease. In both types of patients, Hartfall and Garland are able to announce results which are little short of miraculous. The treatment obviously can have no favourable effect on joints completely ankylosed, but instances are recorded in which the bed-ridden have become able to walk and the seriously crippled have thrown away their crutches and sticks. Hartfall and Garland use the term "cured" as referring to entire freedom from pain and disability other than that arising from bony ankylosis; any results falling short of this arbitrary standard are recorded as "marked improvement"; but it is among the patients numbered in this grouping that the most striking improvements have been seen. Summing up their collected figures, the writers conclude that by means of gold treatment they procured cure or marked improvement in 78% of cases, and slight improvement in an additional 15%. The toxic results were classified as involving the skin, mouth, alimentary tract; additional manifestations were cough, dysphagia and albuminuria. A study of the figures now presented reveals that toxic reactions affect 37% of patients. During the past few months the authors have restricted their dosages to amounts of 0.05 gramme or 0.1 gramme as the single dose for injection, and have made no alterations in this dosage, either out of consideration for the patient's body weight or for the metallic gold content of the salt employed. It is considered that reduction in dosage has produced a great reduction in toxic reactions without lessening the therapeutic effects. The maximum single dose, then, should not be greater than 0.1 gramme, nor the total for each course greater than 1.0 gramme. Of these courses, there should be two, the interval between them being fixed at not less than three months. The intravenous and intramuscular routes of injection are equally effective.

In an extremely interesting paper on the "accidents" which may occur during gold therapy, G. J. Villiers Crosby states that since the days when organic preparations of arsenic first became therapeutic weapons, there has always been much discussion as to the nature of toxic reactions.

Crosby thinks that these "accidents" are commoner than most of us care to admit. Nevertheless, theories as to their causation are almost without number and are correspondingly confusing. Bound up with these toxic phenomena are those included under the name of "biotropism", a term describing a supposed increase in virulence in various "latent organisms", excited by such stimuli as X rays, arsenic, silver, bismuth and gold. Other reactions are believed to be due to the toxicity of the gold preparations themselves. All is confusion. Freund, for instance, opines that the commonly observed skin lesions in gold treatment are born of the accumulation of products of decomposition due to the process of cure. Some say that the phenomena are allergic; certain drugs are in truth allergens, and perhaps gold may be included in the list. But this handy explanation will not include all the toxic phenomena resulting from gold therapy. We have not space to comment upon the multiplicity of symptoms, signs and lesions which may occur in the course of gold treatment—the immediate and focal reactions, the fever, the affections of the skin, gastro-intestinal tract and kidneys, the bronchitis, and the amazing range of blood conditions—including *purpura hæmorrhagica*, agranulocytosis, and malignant thrombocytopenia.

The accidents, we see, are not rare, and are of a varied kind. But though some drugs are dangerous, much value attaches to a careful inquiry into the patient's subjective symptoms, to regular examinations of the urine and blood, and to careful supervision of dosage. As to treatment, all the authors whose work we have considered employ calcium gluconate by the oral route, and Crosby uses liver extracts in the same manner. None of the three has any faith in such medication. It seems that we can entertain hopes for a reduction in the toxicity of the gold salts by some change in their chemical composition or the use of some auxiliary remedy. Further, if gold salts are used, the possible risks should be clearly outlined to the patient before the treatment commences.

#### POST MORTEM RADIOLOGY OF CARDIAC INFARCTION.

EXACT knowledge of the variations occurring in the coronary arterial network of normal hearts was considerably enhanced by the technique of Gross, wherein radio-opaque substances were forced at autopsy into the coronary ostia and the preparation was subsequently submitted to radiography. Further information has gradually accumulated from the coordinated studies of the exact sites of cardiac infarction consequent upon the blockage of individual arteries. Routier, Heim de Balzac, Joly and Lemant<sup>1</sup> have recently amplified these procedures by radiological observation, in three instances, of the thoracic contents of three individuals who were victims of fatal coronary occlusion. Briefly, their

<sup>1</sup> *The Lancet*, June 27, 1936.

<sup>2</sup> *Ibidem*.

<sup>1</sup> *La Presse Médicale*, July 11, 1936.



procedure has been as follows. The cadaver was suspended in an erect position, the lungs were inflated to reestablish their transparency, then barium sulphate solution was injected into cannulas tied into the internal jugular vein and the inferior vena cava. The common carotid artery was used to introduce a sound for the same purpose through the aortic valves and so to fill the left chambers of the heart. Radiograms were obtained in various planes, first after the filling of the right side of the organ plus the pulmonary artery ramifications, and then of the left side after as much as possible of the barium had been washed from the right-sided cavities by a stream of water.

The resultant reproductions, accompanied by tracings combining the two series of pictures, are unique and instructive. The exact dimensions and situations of each altered cavity are plainly visible, besides a clear delineation of the thickness of the left ventricular wall. It is extraordinary to observe how much the swollen myomalacious wall and adherent blood clot appear to encroach upon the cavity available within the left ventricle. The dilatation of the pulmonary vascular tree is also one of the remarkable features of the radiograms reproduced. By this radiographic dissection, one obtains an improved conception of the characters of "moulds" of the cardiac chambers, as they exist *in situ* and before removal of the heart from the thorax. The authors do not pretend that the procedure will aid present-day diagnosis, but it is an instructive exercise in experimental pathology. Certain normal standards have been established by the same workers in respect of the healthy heart, and the present contribution represents their further incursion into the pathological field. Thus, should it ever become possible, as Kerley has suggested, to introduce a sufficiently opaque yet innocuous substance into the circulation during life, and to make photographs according to the present manner, these radiograms would act as valuable controls in diagnosis and prognosis.

#### PROTEINS IN DIETS FOR NEPHRITIS.

SINCE the discovery of protein in the urine of patients suffering from nephritis, and particularly since the recognition of the raising of the urea and non-protein nitrogen in their blood, the practice of limiting protein in the diets of these patients has been followed. Probably owing to the fact that it is often impracticable to have blood analyses carried out, over-zealous practitioners have sometimes imposed these dietary restrictions when more leniency was desirable. In some cases a false tradition has sprung up. For example, though many years have passed since Allbutt pointed out that arterial hypertension could exist without substantive renal damage, many sufferers from hypertension are still dieted rather harshly. Occasionally, too, it is forgotten that the passing of large amounts of protein in the urine is a good reason

for replacing some of this loss by an adequate ration of protein in the diet. But in the main the general rule still holds good, that in those forms of renal disease accompanied by nitrogen retention dietary restrictions are necessary. But on what foundation does this teaching rest? Is there any experimental evidence for this belief? Alfred Chanutin and Stephan Ludewig, who have been carrying out an extensive series of animal experiments on nephritis, have recently published an interesting article setting forth their researches into the effect of diets containing whole dried meat on the renal function of rats submitted to partial nephrectomy.<sup>1</sup> They have previously shown that the renal insufficiency produced by partial nephrectomy could be modified by the use of differing concentrations of whole dried liver in the diet, and they now publish similar results obtained by using dried meat. Those interested may study their protocols, but a summary of their results gives plenty of material for reflection. They compared the effect of a liver diet or a dried whole meat diet on the kidney substance in partially nephrectomized, unilaterally nephrectomized and intact control animals, and found that when all but a small remnant of kidney had been removed a high protein diet was distinctly injurious. In such a case on a low protein diet the animal could maintain renal function tolerably well, but even a small increase in the nitrogen of a diet found to maintain equilibrium upset the balance. The cause of this is not precisely known: both nitrogenous extractives and the split amino-acids have been blamed for the toxic effect. In intact white rats prolonged feeding by liver has been proved to cause renal damage; a similar result could be obtained on a meat diet, but the effect was produced more slowly. This suggests that the type of protein in the diet caused a variation in the degree of renal damage produced. Thus there seem to be two variable factors in renal insufficiency produced by feeding experiments in animals—the composition of the protein in the food and the amount of renal reserve available in the animal. Chanutin and Ludewig point out that if any analogy exists between laboratory animals and patients, it is reasonable to assume that protein foods contain potential nephrotoxic substances. These substances may be of importance. When the renal function is lowered, and if any clinical application of this work is attempted, all that can be said is that definite renal damage is a contraindication to a high level protein intake. What we really want to know is the relationship between the type of protein ingested and the chance of renal damage; this information may perhaps be supplied in part at least by future experimental work. It is obviously still more difficult to judge what degree of renal insufficiency in man might be considered a warning where high protein diets are concerned, but even in this nebulous state the subject is interesting, for some promise is given of further knowledge in a subject that is notoriously difficult.

<sup>1</sup> Archives of Internal Medicine, July, 1936.

## Abstracts from Current Medical Literature.

### RADIOLOGY.

#### Skiagrams and Pulmonary Tuberculosis.

KENNON DUNHAM (*Tubercle*, June, 1936) states that in the tuberculosis clinic of the University of Cincinnati it is felt that the doctors and nurses coming into the sanatorium are not safe unless they have definite evidence of vaccination as shown by calcification of the hilar lymph nodes. If they do not show calcification, extra rest hours are prescribed. Adults with normal lung markings and heavy deposits of calcium in the hilum are regarded as healthy. Such persons are recommended for the most favourable consideration for life insurance purposes.

#### The Radiological Investigation of the Superior Maxillary Antrum.

E. H. SHANNON (*The Journal of the American Medical Association*, February, 1936) discusses the radiological evidence of antral infection, and stresses the fact that reactive changes in the bony walls always occur when pus is present. As the result of congestion in the vascular and lymph channels and marrow spaces, a slight increase of bone density is evident even early in the development of empyema and before the actual osteitic condensation of the chronic infection has occurred. Furthermore, it is necessary at times to rely on its presence as the sole means of differentiating between empyema and retention cyst entirely filling the sinus, or between an antrum containing polypi and one that harbours both polypi and pus. In chronic suppuration the pronounced degree of condensing osteitis is typical of the condition. It involves the walls of the antrum, which are thickened by new bone formation, with inflammatory reaction often apparent also in the malar bone and floor of the orbit. In some cases of chronic suppurative pansinusitis the orbit may be the seat of a condensing osteitis, and may appear actually chalky in a skiagram without there being any clinical evidence of an inflammatory process in the soft tissues of the orbit. The amount of bony reaction in the antral walls may quite obliterate their outline in a skiagram.

#### A Radiological Criterion of Dermoid Cyst.

D. B. PREMISTER, W. B. STEEN AND J. C. VOLDERAUER (*American Journal of Roentgenology*, July, 1936) present a proved case of mediastinal dermoid cyst. Pre-operative skiagrams showed within the shadow of the tumour a definite fluid level that shifted with the position of the patient. This was interpreted as due to a layer of liquid fat floating on aqueous fluid. The fat was fluid at body temperature and therefore free to float on the non-

lipoid fluid-like cream. Excision of the tumour confirmed the diagnosis, and the sign is presented as a criterion for the differentiation of dermoids from certain other mediastinal lesions.

#### The Radiological Aspects of Pneumonokoniosis.

L. H. GARLAND (*Radiology*, July, 1936), in discussing the various aspects of pneumonokoniosis, states that a very acute type of silicosis occurs among workers in certain abrasive soap, scrubbing-powder, glass and vitreous paint industries, especially among packers of siliceous scouring-powders. The radiological findings in these cases consist of a faint, hazy nodulation, but with early limitation of diaphragmatic excursion. The disease may be so rapidly fatal that no second or third stage is manifested; the patients virtually die with a subacute interstitial pneumonia.

#### Radiological Study of Sacro-Coccygeal Chordoma.

C. K. HSIEH AND H. H. HSIEH (*Radiology*, July, 1936) present three cases of sacro-coccygeal chordoma. They consider that there are characteristic radiological signs. Expansion of the bone may be demonstrated in the antero-posterior and lateral views, preferably by stereoscopic examination. The bone is hollowed out, and appears widened in one or more diameters. The outline of the bone may or may not be entirely preserved. Rarefaction or destruction occurs, the involved bone presenting either a loculated appearance with multiple small circular or oval radiotranslucent areas, or the bone is destroyed in large areas. The remains of the undestroyed bone form dense trabeculae, which may extend into the soft tissue mass outside the original normal boundary of the bone. Calcification may occur owing to reactive new-bone formation or deposit of calcified material in the tissues as a result of degeneration or necrosis. This calcified matter appears usually in irregular masses of soft radio-opacity. It must be admitted that these radiological findings are not pathognomonic of chordoma in the sacro-coccygeal region. In fact, such findings elsewhere in the skeleton may indicate giant-cell tumour, osteochondroma or myxochondroma; but the clinical picture, and particularly the sacro-coccygeal location of the lesion, should suggest the diagnosis of chordoma. Giant-cell tumour and chondroma occur in younger persons, and their occurrence in the sacro-coccygeal region is extremely rare.

#### Dilatation of the Pulmonary Artery of Congenital Origin.

L. A. SMITH, W. P. MOENNING AND G. S. BOND (*Radiology*, August, 1936) discuss the numerous conditions which result in enlargement of the first portion of the pulmonary artery. Prominence of the pulmonary bow is frequently the only radiological sign of a congenital cardiac lesion, and is present, as a rule, in adults having

such a lesion. It is not usually present in the early months of such a patient's life, as it requires a period of time to develop dilatation of the pulmonary artery as a consequence of prolonged exposure to ventricular and aortic back-pressure. Except in the cases with asymmetrical division of the *truncus arteriosus communis*, such abnormal pressure is the common causative factor, resulting usually from: (i) communication between pulmonary artery and aorta; (ii) communication between the right and left ventricle; or (iii) stasis in pulmonary circulation from other causes. Variations from the normal radiological appearance in this condition, dependent solely upon the dilatation of the pulmonary artery itself, consist of the following: an increase in the pulmonary bow; a small aortic knob; broadening of the hilum shadows; a degree of broadening of the pulmonary arterial tree, which will vary according to the aetiological factors and their duration; an enlargement of the cardiac outline. The right anterior oblique position is better adapted to the differentiation of the pulmonary bow increase than is the postero-anterior. Expansile pulsation in this part, as in the hilum portions, may or may not be present, depending upon the presence of lamellated clot. The differential diagnosis of dilatations of the first part of the pulmonary artery is not difficult in those patients exhibiting it in minor degree, this being a not uncommon finding in conditions of pulmonary circulatory stasis. If the dilatation is marked and there is a lamellated blood clot, differentiation from a mediastinal tumour may be somewhat difficult if the condition is not kept in mind as a possibility.

#### Right-Sided Aorta.

J. SPENCER AND R. DRESSER (*American Journal of Roentgenology*, August, 1936) report three cases of right-sided aorta. The examination of the oesophagus is of paramount importance in making the diagnosis. In the antero-posterior view the oesophagus is displaced to the left at the level of the clavicle, and in the oblique and lateral views it is displaced anteriorly. There is narrowing of the oesophagus in all views. The trachea is also displaced forward and to the left. There is a prominence in the region of the aortic arch on the left which simulates the true aortic knob, but which is in reality a diverticulum-like vestige of the left aortic root. This diverticulum varies in size, thus causing some variation in the displacement and narrowing of the oesophagus and trachea.

#### Bronchography in Tuberculosis.

B. P. POTTER AND J. PAGLIUGH (*American Journal of Roentgenology*, July, 1936) state that bronchial dilatation of some degree is almost a universal finding in the fibro-cavernous type of tuberculosis. Since these lesions are practically always attacked



by some form of collapse therapy, it is essential that a more or less correct interpretation of the radiological densities should be given before surgical collapse is induced, for, if this interpretation is faulty, either too much may be done, resulting in an increase in the risk and in the sacrifice of comparatively healthy lung tissue, or accessory surgical procedures may be used immediately. In a partially collapsed lung small areas are frequently seen which resemble residual cavities. The introduction of lipiodol frequently shows that these small rarefied densities are due to bronchial dilatation, the obliteration of which is not essential unless positive sputum persists after all cavity-bearing areas have been effectively made to collapse. Lipiodol should not be used in exudative tuberculous lesions, in the acute stage of lung abscess, and in the acute bronchopneumonia which complicates bronchiectasis.

### PHYSICAL THERAPY.

#### Fibroids and Abnormal Uterine Bleeding.

ALDEN H. WILLIAMS (*Radiology*, March, 1936) discusses the diagnosis of uterine bleeding, and lays particular stress on the fact that the small amount of irradiation necessary to treat uterine fibroids must not be undertaken if malignant disease can be suspected. Hysterectomy mortality of from 1% to 4% is openly admitted, while the possibility of irradiation as a treatment is often not discussed at all with the patient or relatives. The author thinks that irradiation has advantages of little loss of time and of no danger to life; it is logically well worth considering. It is the author's opinion that in most cases of menorrhagia, associated with severe anemia, one must gamble to some extent; but other methods of treatment should be tried before hysterectomy. Hysterectomy for simple menorrhagia would not be radical, but ruthless. Thirty-four large fibroids were treated, and twenty-four completely disappeared. Excepting two with complications, the remainder of the patients were completely relieved of symptoms and had only as a benign residue from one-fourth to one-sixth of the original mass and the usual menopausal record. In eight menorrhagic cases, although menstruation returned, further treatment was not required. One of these eight patients passed through normal pregnancy less than a year after treatment. All of the patients, with a few exceptions, were treated outside hospital.

#### Pre-Operative Irradiation in Primary Operable Cancer of the Breast.

FRANK K. ADAIR (*The American Journal of Roentgenology and Radium Therapy*, March, 1936) discusses pre-operative irradiation in primary operable breast cancer. By operable he means that the disease is located in the breast or even in both breast and

axilla, but not beyond. In the hands of the most expert surgeons he finds that (a) if the breast only is involved, approximately a 70% five-year cure is obtained; (b) if both the breast and axilla are involved, the five-year cures are approximately 20%. The two groups combined give approximately 35% five-year cures. If pre-operative irradiation is to be effective, it is necessary to allow two months as a minimum after the completion of the treatment for irradiation to become fully effective in producing the desired tissue changes. The direct killing effect on the more sensitive cancer cells, together with the slower development of fibrosis and endarteritis and other results of irradiation, consumes a period of at least eight to ten weeks. Many clinicians will object to this delay, believing that the rate of tumour growth exceeds the rate of tumour starvation and strangulation secondary to irradiation; but the author states that it is obvious that the rate of tumour destruction far exceeds the rate of tumour growth while the irradiation is being carried out. His study is based on 117 cases of operable mammary cancer. In each case a positive biopsy was obtained; pre-operative irradiation was carried out; two or three months later a radical mastectomy was performed, and careful tissue studies were made. Of the 117 patients, 65 were treated through five portals by the fractionated dose method; a 200 kilovolt X ray machine was used, giving 300 r daily to each of two portals. Fifty-one patients were treated similarly, a four gramme radium element pack being used, and 8,000 milliecurie hours being given to one portal per day. In all instances irradiation caused clinical reduction in the volume of the breast tumour. To a less extent this was true of the axillary disease. The tumour tissue softens and commonly takes on the same consistence as the mammary tissue. On microscopic examination of the tissue after removal it was found that in sixty-five cases treated by X rays with 200 kilovolts, thirty-six patients were given 1,200 r per portal, with a complete microscopic disappearance from the breast in 19% of the cases, and from the glands in 4%. Another group was similarly treated, 1,800 r per portal being given; this group gave a 33% microscopic disappearance of the cancer from the breast and 22% from the axillary glands. The group treated by 24,000 millicurie hours per portal obtained a 35% disappearance of the tumour from the breast and 13% from the axilla. The same type of microscopic effect is delivered by X rays as by radium, and it was not possible for the author to distinguish microscopically which type of therapy had been employed. In the patients receiving 24,000 millicurie hours per portal by the radium pack, distressing skin ulceration persisted at the time of operation in 54% of cases. The author suggests that this technique is not satisfactory, because it is too

drastic when there is overlapping of the two breast portals. Sterilization of the ovaries in pregnant women who have carcinoma of the breast is advised; also in all women under thirty-five years of age.

#### Treatment of Benign Uterine Haemorrhage by Irradiation.

J. J. QUINCY (*Radiology*, August, 1936) rarely uses radium in benign uterine haemorrhage. He finds deep X ray therapy extremely satisfactory. His technical details are 200 kilovolts, 5 milliamperes of current, screenage 0.5 millimetre of copper plus 1.0 millimetre of aluminium. He uses four 15 by 15 centimetre portals, two anteriorly and two posteriorly, and delivers a dose of 650 r in the centre of the pelvis. Every attempt should be made to exclude malignant disease from the diagnosis by bimanual and visual examination of the cervix, Schiller's iodine test, and microscopic examination of scrapings. Schmitz states that good end results of irradiation treatment in functional uterine haemorrhages were obtained in 98.14% and in bleeding uterine myomata in 94.5% of cases. The rays are considered by the author to produce their effect by acting both on the ovaries and on the tumour.

#### Further Development in Supervoltage Therapy Apparatus.

T. LEUCUTIA AND K. E. CORRIGAN (*Radiology*, August, 1936) deal with the latest developments in supervoltage X ray therapy apparatus, both as regards tube design and generating plant construction. It would appear that increases in voltage from 400 to 600 kilovolts have, in certain instances, decided advantage over irradiation at 200 kilovolts. Other phenomena arising from the development of supervoltage apparatus are the production of neutron rays and artificial radioactivity, which may prove of definite medical value in the future.

#### Influence of Short Wave Radiation on Constituents of the Blood.

DISRAELI KOBAK (*Archives of Physical Therapy, X-Ray, Radium*, July, 1936) reviews available experimental data of effects of short wave radiation, and gives his own observations on effects in one hundred hospital patients. The conclusions are: Short wave therapy apparently influences the various constituents of the blood. Minimal dosage of short wave radiation tends to (a) raise the refractive index, (b) increase the viscosity, (c) raise and lower the blood sugar, (d) increase the sedimentation rate. The changes produced are only significant of the internal influence of short waves, and require more detailed correlation on actual clinical material. The applicability of the experimental data to therapy is clearly indicated by their biophysical and biochemical character, the ultra short regions having a more selective action and a more prolonged heating effect than are found in the longer regions of short wave diathermy.



## British Medical Association News.

### SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Alfred Hospital, Melbourne, on July 15, 1936. The meeting took the form of a series of demonstrations by members of the honorary staff of the hospital and the staff of the Baker Institute.

#### Asthma.

DR. CHARLES SUTHERLAND showed six patients to illustrate methods of investigating and treating asthma. The methods of detecting hypersensitiveness to pollens, dusts and foods were demonstrated, and the more important methods of treatment in asthma and hay fever were also discussed.

The first patient was a woman, who had had asthma for three years; she had been subject to attacks all the year round, but they had been worse in the summer. Tests had revealed hypersensitiveness to kapok and to many pollens, and the patient had been instructed to avoid kapok in bedding *et cetera*, and treatment by desensitization had been started. Dr. Sutherland said that, as a rule, the results in these cases were excellent.

The second patient, a woman, had had a very similar history to that of the first patient; she had, however, been suffering from asthmatic attacks off and on all her life, and they had occurred only in the summer; she had shown hypersensitiveness to pollens, but had not reacted at all to kapok, feathers, dust *et cetera*. Dr. Sutherland said that treatment by desensitization with a suitable mixture of pollen extracts would probably lessen the attacks noticeably this year.

The third patient was a woman, who had a similar history to that of the other two. She had reacted to kapok and pollens. Dr. Sutherland said that desensitization last year had given almost complete relief from attacks this year.

Another patient, a married woman, had suffered from asthma each summer for ten years and had reacted to grass pollens; in this case treatment by desensitization had just been started.

Dr. Sutherland also showed a female patient who had had asthma all her life. Symptoms had been more severe in the summer months, but she had not been free from attacks in the winter; she had been quite free of any symptoms while on a short sea trip. Dr. Sutherland said that the patient showed a very definite sensitiveness to horse dander, and since desensitization three years ago she had been fairly free of symptoms.

MISS SHARWOOD demonstrated the microscopic appearance of the commoner pollen grains, and graphs showing the quantities present in the Melbourne air during the summer months.

#### Undescended Testes.

DR. H. C. COLVILLE showed several patients to demonstrate the treatment of undescended testes. He said that for the past nine years he had used the Torek operation, and considered the results to be uniformly satisfactory. He showed two boys, aged ten years, in whom the first stage of the operation had been completed, the testes being lodged in a pocket formed between the skin of the scrotum and the adjacent part of the thigh.

Dr. Colville also showed a patient, aged twenty years, on whom the operation had been performed nine years previously; this patient was shown to illustrate the late end results.

Recently treatment by the injection of anterior pituitary hormone had been tried, and in a series of eight cases two had been successful in that the testes had passed from the lower part of the inguinal canal into the scrotum. Dr. Colville said that each of these boys, whose ages were eight and fourteen years respectively, had had twenty injections

of one cubic centimetre of "Antultrin S" over a period of ten weeks; in the older boy an inguinal hernia had appeared for the first time concurrently with the descent of the testis. Dr. Colville said that the method was still regarded as being on its trial, and he thought that it seemed likely to be successful in only the most favourable cases.

#### Chronic Urinary Tract Infections.

Dr. Colville, in conjunction with Miss BRITTE, of the Baker Institute, also showed four children illustrating the treatment of chronic infection of the urinary tract by sodium mandelate. The patients shown were all females, and their ages ranged from four to fourteen years; the history of urinary infection in each case had dated back for a number of years, and three of the four patients had been actually under observation and treatment for over two years. Dr. Colville said that the common manifestations of the condition were the constant presence of large quantities of pus and *Bacillus coli* in the urine, with very little constitutional disturbance, but with recurrent attacks of fever, abdominal pain and intense frequency of micturition and irritation. A variety of methods of treatment had been tried in each case before sodium mandelate was used; these included urinary antiseptics, ketogenic diet, and renal pelvic lavage, without any appreciable benefit; and the condition had been regarded as practically incurable. The administration of sodium mandelate had resulted in a dramatic cure in every case, as shown by a rapid disappearance of bacilli from the urine and its subsequent maintenance in a sterile condition. The average bacterial count of the urine, which was 1,000 million organisms per cubic centimetre before treatment, dropped to nought before the treatment was concluded. Dr. Colville said that the standard treatment lasted for two weeks, and consisted of the administration of thirty to sixty grains of sodium mandelate every six hours and the restriction of fluids as far as possible. At the same time the urine was kept strongly acid by giving ten to fifteen grains of chloride of ammonium every six hours, the amounts varying according to the pH of the urine, which had to be kept below 5.2 for the treatment to be effective. The bacterial count and the daily testing of the urinary pH had been carried out by Miss Britte, who also demonstrated charts which she had prepared showing the variation in the factors during treatment, and the method of finding the pH by an indicator of methyl red.

#### Ear, Nose and Throat Conditions.

DR. BRYAN FOSTER AND DR. T. G. WYNNE showed a man who had been admitted in September, 1935, with a hard fixed mass in the right side of the neck, which was regarded as malignant. The nose and throat examination revealed no abnormality; an operation was performed, at which a large quantity of pus was evacuated, and the swelling disappeared; but it recurred five weeks later, and was very hard. Treatment was to be carried out with radium.

Another patient shown by Dr. Foster and Dr. Wynne was a man who had been subjected to an urgent tracheotomy by his medical attendant with a razor for acute oedema of the glottis. The incision had divided the thyroid cartilage and had opened the larynx, and the patient had been admitted to hospital holding the two halves of his larynx apart. The patient was treated by low tracheotomy and repair of the original wound; there was a slight distortion of the interior of the larynx, but the patient had quite a good voice.

A male patient, twenty years of age, had suffered from acute frontal sinusitis with extensive oedema of the forehead. The patient had been treated by making a small incision in the floor of the sinus and sewing in a small rubber catheter. His recovery was uneventful, except for a small sinus which had persisted; the wound was opened up again and a small sequestrum was removed from the floor, and from then on the patient's recovery was uneventful.

Dr. Foster and Dr. Wynne also showed two cases illustrating rib implantation for depressed bridge of the nose.

### Bronchoscopy.

Dr. W. S. NEWTON showed lantern slides of radiograms of several cases, three of which were cases of foreign body in the lung with a collapsed right lower lobe. The foreign body had been removed by the bronchoscope, and the lobe became immediately filled with air, but subsequently collapsed owing to the swelling of the bronchial mucosa. Complete recovery had followed further bronchoscopic treatment.

One patient, who, after the removal of a foreign body from the lung at another hospital, had been allowed to return to her home in the country too early, had, following mucosal swelling, developed bronchial stenosis which resulted in widespread bronchiectasis and disorganization of the lung.

In another case bilateral apical lung abscess following bronchopneumonia, treated by bronchoscopy and posture, had resulted in one side healing and only a small residual cavity remaining on the other, which was maintained in a healthy condition by posture.

Dr. Newton showed a fibromatous tumour which had blocked the right middle lobe bronchus and had caused the collapse of the middle lobe. It had been removed by bronchoscopy, and the patient had completely recovered.

Dr. Newton also showed some skiagrams taken after lipiodol injection and demonstrating the necessity of first aspirating the lung before an injection to obtain a proper conception of the pathological condition.

### Sarcoma of the Kidney.

Dr. JOHN KENNEDY showed a patient who had been operated on for a renal newgrowth in 1926. When it was discovered that there was a large inoperable sarcoma arising from the region of the suprarenal body, the wound was closed because the condition was inoperable. A section of portion of the growth removed at the operation was reported as a small spindle-celled sarcoma. Radium needles were inserted into the growth, and the patient was sent to the Austin Hospital in an almost moribund condition, where she had unexpectedly recovered, and was at the time of the meeting enjoying normal health.

### Fracture of the Tibia.

Dr. Kennedy also showed a number of cases of fractured tibia, in which slow union or persistent poor position had been treated by open reduction and the splitting of the bone-ends longitudinally with an osteotome. A rapid stimulation of bony growth resulted.

### Administration of Gas.

Demonstrations of the administration of gas were given by Dr. DOUGLAS G. RENTON. The "closed circle" (carbon dioxide absorption) technique for the administration of the gas anaesthetics was shown, and a description of and a commentary on the method were given. The "Austox" resuscitation outfit was demonstrated. This outfit was designed for the treatment of poisoning by carbon monoxide *et cetera*. It offered the most efficient and economical means of administering oxygen or carbon for short periods, for example, for periodic lung inflation in the post-operative period.

### Radiography.

Dr. ALLAN J. G. MACKAY demonstrated a motion picture made by means of radiograms, showing the movements of bones after excision of the elbow joint.

Dr. Mackay also demonstrated the action of the heart and the upper gastro-intestinal tract with opaque meal.

Dr. Mackay and Dr. LOVE showed some radiograms depicting lung and bone conditions comprising a series of lung neoplasms before and after lipiodol examination, and also after bronchoscopic removal of tumours. The bone cases mainly consisted of unusual examples of fibro-cystic and malignant disease, also of bone decalcification.

Dr. Mackay also showed some interesting films and photographs of a fetal monster.

### Osteomyelitis.

Dr. FAY MACLURE showed two patients who had suffered from osteomyelitis and who had been treated conservatively. Both patients had been very ill when they were admitted to hospital; they had been treated by splinting as for a suppurative arthritis, and then the condition was left to subside. In one patient a large collection of pus had pointed under the skin and was let out with a tenotome incision. The patient then developed a fluctuant swelling which subsided spontaneously. When the splint was removed too early from one patient an immediate rise of temperature and return of symptoms occurred; these subsided when the splint was replaced, thus proving the efficacy of the treatment.

Dr. MacLure suggested that by avoiding operation the patient was spared a further pyæmia, carrying risk of fresh bone infection, while convalescence was just as rapid. Dr. MacLure said that one patient was at work after three months, and the other was walking on her leg for half an hour a day, but was still liable to exacerbations if she used the limb too much.

Dr. MacLure also showed the radiogram of a third patient, a woman, sixty-five years of age, who had contracted osteomyelitis at the age of seven, and whose hip had discharged every few weeks ever since. This showed that osteomyelitis could remain with its victims throughout life.

### Malignant Ulcer of the Knee.

Dr. MacLure showed a patient with an ulcer of the knee which had been present for twenty-three years intermittently. The scar tissue was continually breaking down under the influence of movement, but during the last few months a malignant change had supervened.

### Stent Grafting.

Dr. BALCOMBE QUICK showed a number of patients to illustrate a method of treatment of chronic osteitis and osteomyelitis in the tarsus, the tibia and the lower end of the femur. Preliminary treatment had consisted of free removal of the diseased and sclerotic bone by gouge and curette in such a way as to produce a cavity of more or less regular contour. Some ten days later the cavity was grafted by the Stent method. Dr. Quick described the technique of the preparation of the cavity and demonstrated the application of Thiersch grafts to the mould.

### Enchondroma.

Dr. A. J. TRINCA showed a female patient, thirty-six years of age, who, twelve months previously, had come to the hospital with a tender swelling over the right fifth metacarpal bone following an injury a few weeks earlier. The provisional diagnosis was traumatic periostitis, but radiographic examination revealed a typical enchondroma involving the distal two-thirds of the bone. At an operation in July, 1935, the tumour tissue was completely curetted away, and a bone graft from the tibia was inserted. Microscopic examination confirmed the diagnosis. Subsequent radiographic examination at three months' interval showed that the graft had taken, and the latest films, made one week before the meeting, showed that the cavity in the bone had been completely restored, and that there was no recurrence. Radiological examination of the other limbs failed to reveal any evidence of chondromata.

### Spontaneous Fracture of the Femur.

Dr. Trinca's next patient was a woman, thirty-eight years of age, a nullipara, who was admitted to hospital on October 27, 1933, on account of a spontaneous fracture in the middle of the right femur. The bone had shown some cortical thinning and extensive decalcification on radiographic examination, but no definite opinion could be given on the true pathological nature of the process. Other bones had shown similar decalcification; the blood calcium was within normal limits—nine milligrammes per hundred cubic centimetres of serum—and the Wassermann test yielded no reaction. After five weeks there had been no sign of union, and an open operation was performed and



the ends of the fractured fragments were freshened and impacted. The bone was found to be very fragile, and could almost be cut with a scalpel. Union had slowly occurred, and the patient was discharged from hospital on March 10, 1934, on a walking caliper.

On September 4, 1934, she was readmitted to hospital with another spontaneous fracture in the same femur just above the condyles. Radiological examination showed that decalcification was more pronounced than on the previous examination in 1933 and early 1934. The limb was put in plaster and good union eventually took place.

On April 20, 1936, the patient was again readmitted to hospital with a spontaneous fracture in the middle third of the right tibia and fibula. Radiographic examination revealed a further progression in decalcification, and the bones appeared to be foreshortened, and union occurred slowly.

Dr. Trinca said that the case was interesting on account of the obscure pathology underlying the haliteresis. He said that nine years earlier a hemi-thyroidectomy had been performed; but the suggestion that the condition was associated with parathyroid dystrophy was negated by the fact that there had been no tetany or other evidence of parathyroid deprivation. Further, the administration in full doses of parathormone and calcium therapy following her first admission to hospital had not resulted in any improvement. The other known causes of haliteresis, such as *fragilitas ossium*, osteomalacia following pregnancy and fibrocystic disease, could all be eliminated on diagnostic findings. The case remained a problem on account of the obscurity in pathology and the progressive nature of the disease.

#### Tumour of the Thyroid.

Dr. Trinca's next patient was a female, forty-eight years of age. Five years previously she had been operated on for thyrotoxicosis and an enlarged thyroid which had been present for two years; subtotal thyroidectomy was performed. The histopathological report by Dr. R. A. Willis was carcinoma. A slow gradual enlargement of the thyroid followed the operation, and a cystic mass appeared in the mid-line. In July, 1935, the patient underwent a second operation, and on this occasion a cystic swelling the size of a golf ball was found fairly adherent to the trachea and to the lateral lobe; it was firm and infiltrated the infrahyoid muscles. At this operation as much as possible of the thyroid tissue was removed, but it was impossible, owing to infiltration of the trachea and other structures, to perform a total thyroidectomy. No thyrotoxicosis was present. Histopathological examination by Dr. Willis revealed an identical picture with that found at the first examination. Following the operation, recurrence was more rapid than after the first examination, and the condition did not respond to deep X ray therapy; the cystic mass developed as before operation, and relief from time to time was given by aspiration. The case was interesting on account of the comparatively slow growth, the absence of thyrotoxicosis and, as far as could be ascertained, of metastases.

#### Cranio-Cleido-Dysostosis.

Dr. Trinca also demonstrated cranio-cleido-dysostosis in a boy, fourteen years of age, who had been admitted to hospital on June 11, 1935, with mild cerebral concussion. The outer two-thirds of the clavicles were missing, and a small rudimentary incompletely ossified bar represented the inner portions.

Dr. Trinca said that there was also radiological evidence of defective ossification of the membrane bones of the skull; the patient was otherwise well developed and played games well and vigorously, and had had apparently no disability whatever from his congenital deformity.

#### Fibro-Sarcoma of the Peroneal Nerve.

Another patient shown by Dr. Trinca was a woman, twenty-seven years of age, who had been admitted to hospital on July 27, 1935, complaining of foot-drop which she had noticed for three months; she said that she had also noticed a small lump like a pea in the lateral portion

of the popliteal space. The patient, on first noticing the foot-drop, had sought the services of a chiropractor, who had manipulated her dorsal spine; and when the patient had shown him the lump in the popliteal space he had treated it with vigorous massage; this treatment had caused the lump to become painful, and it had enlarged rapidly. Examination of the patient on her admission to hospital had revealed complete paralysis of the extensors of the foot and partial anaesthesia on the dorsum of the foot between the first and second toes. An operation was performed on July 29, 1936, and a yellowish tumour, about the size of a small olive (about two centimetres by one centimetre), involving the whole circumference of the peroneal nerve, was exposed and an attempt was made at enucleation. Dr. Trinca said that the tumour had diffusely infiltrated the nerve and was surrounded by thinned out nerve fibres; it was resected and an end-to-end anastomosis of the nerve was performed. Dr. Willis had reported that the growth was a richly cellular, active fibro-sarcoma with myxomatous areas; the tumour extended diffusely along the nerve, and recurrence and possible metastases were to be feared.

Dr. Trinca said that a radiographic examination of the lungs had failed to reveal any metastases; following the operation the patient had been given two courses of deep radiotherapy. At the time of the meeting the patient had slight extension of the toes, but the foot-drop had not improved, the anaesthesia was improving, and Tinel's sign was present.

#### Demonstration of Tissue Culture.

MR. J. SUTHERLAND AND MISS M. CRANAGE showed permanent preparations of six types of cerebral tumours which had been cultivated. These preparations illustrated the differences in the appearance of the outgrowth of cells in each case, and the characteristic type of cell which had migrated. The cultures demonstrated consisted of: meningioma, astrocytoma, spongioblastoma, angioblastoma, medulloblastoma and angle tumour. Photomicrographs of living, unstained cultures were included in the demonstration. Mr. Sutherland and Miss Cranage also showed samples of the media used, the method of preparing the cultures, and a microscope fitted with a warm stage for use in this work.

#### Chronic Pyo-Bacilluria Charts.

MISS HILDRED BUTLER demonstrated charts for the four cases of chronic pyo-bacilluria demonstrated by Dr. H. C. Colville. The charts showed the bacterial contents of the urine before, during and after treatment with sodium mandelate, and also showed the amounts of ammonium chloride necessary to maintain the urine at a sufficiently low pH. Treatment with sodium mandelate resulted in the disappearance of the bacilluria, and in each case the urine remained sterile after cessation of treatment.

#### Lange Tests.

DR. W. J. PENFOLD AND MISS MARY PHILLIPS demonstrated a series of Lange tests of normal, paretic, luetic and meningitic spinal fluids, and discussed with those present the difficulties encountered in making Lange's gold sol by the oxalic method. Mr. J. Sutherland, who had had considerable successful experience with this method, was unfortunately unable to be present on account of illness. The chief points to which Dr. Penfold and Mr. Sutherland desired to direct attention were that, on account of the difficulties associated with the preparation and use of Lange's gold sol, several substitute sols had been introduced and were widely used. However, it was soon evident that, by comparison with the Lange gold sol, the substitutes had their limitations, usually requiring much more spinal fluid and failing to show the finer reactions given by the gold sol. For example, they might show up frank paretic spinal fluids, but with cerebro-spinal fluid in brain tumours gave very little information in the more delicate reactions that were quite readily demonstrated by the gold sol reaction. Mr. Sutherland had had that experience when using the colloidal carbon of Looney. The colloidal carbon was very simply prepared electrolytically, but it suffered



from two serious defects—its sensitivity varied in different batches according to the amount and rate of electrolysis, and the sensitivity increased from day to day on being stored. Another difficulty was the liability to contamination by moulds, which grew profusely on the surface of the carbon sol stock. Therefore, whenever possible, it would seem that for the best work the colloidal gold reaction was essential.

The methods of preparing colloidal gold were legion, thus indicating that there was no recognized best method. Lately attempts had been made to standardize the conditions and reagents so that the gold sol might be produced repeatedly and consistently and with more or less constant properties. Patterson had advocated the mixing of the reagents for the oxalate method in the cold and then heating the mixture to produce the gold sol, rather than mixing the reagents at a high temperature, when changes occurred quickly and were on that account more difficult to control. Patterson had also advocated the standardization of his final sol, using a weak concentration of his own lysed blood cells for the purpose. Williams had later suggested improvements on this method, whereby he claimed that he could produce a stable gold sol of standard sensitivity. Experience with that method had confirmed the claims of Williams and Patterson. Dr. Penfold said that they had followed Williams's technique and had prepared pooled batches of five to eight litres at a time, which kept perfectly during their stock life of four months. Some experimental batches had even been kept for over six months without showing any evidence of change. The stock sol was prepared by using a small amount of N/50 potassium hydroxide determined by preliminary titration. The reagents were all mixed in the cold; then the mixture was rapidly heated to near boiling point. The mixture containing the correct amount of potassium hydroxide gave a final sol of the required colour and appearance. On that test it was a simple matter to make one after another litre batches of consistent character. Dr. Penfold and Miss Phillips had found that the time taken to heat the mixture was important, and that once the reagents were heated the mixture must be heated forthwith. If a batch failed to turn just before coming to the boil (as specified by Williams) they had found that actual boiling for a minute or two might turn the sol, and some had even turned after being taken off the burner; the late turning had appeared to be due to too rapid heating.

Dr. Penfold and Miss Phillips said that it was very important in that method, as in others, to use pure reagents; Merck's blue label quality was best, if it was available. They had tried photographic gold chloride of commerce without success, but had had no trouble since they had imported Merck's blue label gold chloride. Most workers in that direction had advocated triple distilled water; Dr. Penfold and Miss Phillips used water from a tinned copper still which was redistilled in a glass still, but they had found that the first distillate was satisfactory. They said that they used freshly redistilled water and special Jena resistance glassware, which was cleaned chemically with the usual care and finally rinsed with redistilled water and allowed to drain dry, away from chemical fumes; the pipettes and test tubes were similarly treated.

The bulk batch, of from five to eight one-litre lots pooled, was then stored in a cool dark cupboard. The sol in this alkaline condition was stable, but not suitable for use in the actual test without adjustment by the addition of N/50 hydrochloric acid to a standard sensitivity. The amount of N/50 hydrochloric acid required per 100 cubic centimetres of sol was determined by a series of titrations, and, once determined, held good for the stock life of the bulk sol. Williams had advocated the use of a solution of edestine as a stock standard in the final acid titrations, but they had not found that method altogether satisfactory, and preferred to use fluids from general paralysis of the insane patients obtained fresh from Mont Park. A positive fluid from such a patient giving a reaction of about 555532100-0 and a "negative" fluid giving 0000000000-0 or at most 0011000000-0 were used as test fluids in the hydrochloric acid titration and in routine weekly tests as con-

trols. Cerebro-spinal fluid might be preserved for months in equal parts of pure glycerine (Merck's) without affecting the gold sol reaction (double amounts of the mixture being used). The present system was to store all the cerebro-spinal fluids for the Lange test in the refrigerator until the weekly tests were carried out. Sufficient of the bulk stable sol was acidified to standard sensitivity just before it was required for the actual tests.

The method and use of the stable sol seemed to leave little to be desired, and it was with a view to helping other laboratories where apparently difficulty had been encountered and was still being experienced, that Dr. Penfold and Miss Phillips wished to bring their method to the notice of their *confrères*.

#### Pathological Demonstration.

Dr. R. A. WILLIS demonstrated a series of specimens of rare lesions of the alimentary canal, namely, extensive deposits of Hodgkin's tissue in the mucous membrane of the stomach in a case of Hodgkin's disease; multiple neurofibromata of the small intestines in a case of von Recklinghausen's neurofibromatosis; lymphosarcomatous infiltration of the intestinal mucosa secondary to a primary lymphosarcoma of the root of the mesentery; multiple polyposis of the colon with supervening carcinoma; intussusception caused by an intestinal metastasis from a malignant melanoma of the skin; a case of simultaneous diverticulosis of the small intestine and a solitary intestinal myoma from the central parts of which fatal hemorrhage into the bowel had taken place.

Dr. H. W. S. LAURIE showed clinical charts, skiagrams, photographs and *post mortem* specimens from a case of advanced acromegaly. The pituitary gland was the seat of a typical eosinophile adenoma; the bones showed characteristic changes; the thyroid gland was much enlarged and contained multiple adenomata; the adrenal cortex showed hyperplastic changes; and the heart was greatly hypertrophied and dilated, though there was no valvular disease. Death had been due to heart failure following partial operative removal of the pituitary tumour.

#### Muscular Dystrophies.

Dr. LEONARD COX showed patients together with a film illustrating methods of treatment recently applied to *myasthenia gravis*, the muscular dystrophies and to *syringomyelia*.

A film was shown of a man, aged fifty-four years, who had shown the signs of *myasthenia gravis* for ten weeks prior to his admission to hospital. These had commenced with double vision and drooping of the right eyelid. The signs had rapidly progressed until all movements of the right eye were gravely impaired. All the movements of the body were now affected, the arms, however, being much more affected than the legs. For four weeks the patient had been given large doses of ephedrine without any improvement. The film showed the dramatic improvement which was to be observed following the injection of one cubic centimetre of "Prostigmin". It was demonstrated that the eye movements were fully restored, that the arms, which could barely be abducted against gravity, were now possessed of powerful movements, and that the grip, which previously could not be measured by the dynamometer, was restored to fully two-thirds of a normal grip. For a period of about three hours the patient was nearly a normal man; by eight hours all the effects had passed. He was now receiving a daily injection of "Prostigmin" with considerable benefit.

A girl, fifteen years of age, was shown suffering from the juvenile type of muscular dystrophy. Following the administration of glycine over several months the progression of her illness had seemed to be arrested. Her condition had improved so that she was able to walk better and to move her shoulders more strongly; she had a better general sense of well-being.

Dr. Cox remarked that the improvement was often said to be disappointing and never dramatic. An arrest of the downwards course and some slight improvement seemed the most that could be expected.

A man, aged twenty-seven years, suffering from syringomyelia, was shown. The condition had been coming on for many years. Prior to operation the advance of the illness was rapid. There were hardly any movements of the upper arms and shoulder girdles. The affected muscles showed marked fibrillation. The hand muscles were less affected, but were rapidly wasting and now showed considerable weakness. A dissociated anaesthesia was present over the second to sixth cervical segments; below this area there was some impairment to light touch.

At operation by Dr. Trumble a syringomyelic cavity was freely opened. Subsequent improvement was dramatic. Over a period of four months the patient's hand grip had considerably improved as judged by dynamometric measurement, and he could now shrug his shoulders powerfully. Pin point could now be appreciated as such over the area previously analgesic. The improvement was still continuing.

A woman, aged twenty-three years, suffering from syringomyelia and syringobulbia, was shown. The dissociated anaesthesia lay mainly in the left side, and extended from the first cervical to the fourth thoracic segment. Recently the left side of the tongue had become wasted. The patient displayed a gross kyphosis, succulent swollen hands and considerable weakness of shoulder and arm movements. She had been admitted to hospital for operation, as her condition was rapidly progressing.<sup>1</sup>

Both of these patients had been subjected to previous X ray therapy without benefit.

Dr. A. B. CORKILL discussed the physiological and biochemical findings in two of the patients shown by Dr. Cox. He pointed out that in muscular dystrophy the fundamental defect appeared to be an inability to store creatine. He said that normal persons did not exhibit creatinuria, and that if creatine in moderate doses was administered, it was retained in the body. That retention had been explained by assuming that the creatine was built up in the muscles to "phosphagen", a labile compound of creatine and phosphoric acid. Dr. Corkill said that the breakdown of "phosphagen" to creatine and phosphate furnished energy for the resynthesis of phosphagen. Patients suffering from muscular dystrophy exhibited a fairly constant creatinuria, and creatine administered orally was almost quantitatively excreted as such in the urine. The exact source of creatine in the body had not been decisively demonstrated, although some evidence had been elicited from studies on muscular dystrophies. Of the various amino acids, glycine produced the greatest increase in creatine excretion; after its continuous administration the creatine excretion gradually fell and might reach its normal level observed before the glycine therapy. Apparently glycine was being transformed into creatine, which was being retained in the body. Dr. Cox had shown a case of muscular dystrophy which had conformed in general to Dr. Corkill's remarks, and, although there had been no dramatic improvement, the condition had not progressed.

Dr. Corkill said that another patient shown by Dr. Cox was a definite contrast to this patient. Dr. Cox's other patient, suffering from *myasthenia gravis*, had shown no definite disturbance in creatine metabolism. Recent investigations by Dale and Feldberg had shown that acetylcholine, in addition to functioning as the chemical transmitter of parasympathetic and certain other nervous effects, might possibly be concerned in the transmission of impulses from a nerve to voluntary muscle. Acetylcholine, which was an unstable ester of chlorine and acetic acid, was known to be destroyed rapidly by blood esterases, and the suggestion had been made that in *myasthenia gravis* there was either an insufficient production or too rapid destruction of acetylcholine at the motor nerve ends. In either case the administration of eserine or its non-toxic form "Prostigmin" should prove of benefit by virtue of its action in inhibiting the action of esterases and, therefore, in the case under consideration, by delaying the destruction of acetylcholine.

Dr. Corkill said that, although the investigations being carried out at the Baker Institute had not yet been com-

pleted, it did not appear that any definite alterations in blood esterase activity were present in *myasthenia*, and the possibility of an increased muscle esterase system was being considered. Such a condition would more readily explain the fact that in *myasthenia* only groups of muscles might be affected; in addition, it would appear that the presence of an increase in blood esterase activity would produce generalized disturbances in parasympathetic function.

#### Surgery of the Urinary Tract.

Dr. C. J. O. BROWN showed a large number of cases illustrating surgery of the urinary tract.

One patient, a man, thirty years of age, had suffered from severe and recurrent right-sided ureteric colic for four months, and, though no calculus could be demonstrated by radiography, the kidney was exposed at operation and a skiagram was taken of it outside the wound; the pelvis was opened and a catheter was passed down into the bladder. Though no stone was found, he had not had any further colic seventeen months after operation.

Another patient, a man, thirty-six years of age, had been attending the hospital at intervals since 1919 for frequency of micturition, dysuria and haematuria. In spite of drugs, vaccines, vesical and renal lavage and suprapubic drainage, and though Dr. John Kennedy in 1928 had exposed both vesicles, there had been no improvement. The patient had a contracted irritable bladder, and Dr. Brown was contemplating transplantation of the ureters into the colon.

Another man, fifty-five years of age, had had his left kidney removed by Dr. St. Clair Stewart in 1929, and later developed tuberculous disease of the knee, on account of which the leg was amputated in August, 1929. In view of the subsequent events and the appearance of the kidney, it was probable that the patient's renal lesion was primarily tuberculous. At the time of the meeting he was in good health and was working as a carpenter.

A female patient, twenty-six years of age, had been subjected to right-sided nephrectomy in July, 1929, for symptomless haematuria, caused by the presence of a small oxalate stone at the pelvi-ureteral junction; she had passed stone fragments in February and in April, 1930, but had had no further urinary trouble since, though she had been treated elsewhere for a softened gland in the neck in 1933. The urine had been searched for tubercle bacilli without result, and she had become quite well.

A male patient, forty-five years of age, had had severe right-sided renal and ureteric pain in 1928 and calculous anuria in April, 1933. After abdominal section a stone was palpated in the ureter at the level of the fourth lumbar vertebra and was removed extraperitoneally. No further trouble had occurred.

A woman, thirty-seven years of age, who had had her right kidney removed in April, 1935, because of hydronephrosis with grossly enlarged ureter, which had caused symptoms for two or three years, had made an uneventful recovery.

Another patient, a man, twenty-eight years of age, had been subjected to left nephrectomy for hydronephrosis with stone in January, 1932, and had remained in good health ever since.

A female patient, fifty years of age, had been operated on in July, 1935, for a large perinephric abscess around a leaking pyonephrosis which had formed as the result of the presence of renal calculi. Though her general condition was excellent, she still had a discharging sinus in the loin, and Dr. Brown intended to remove the kidney.

Dr. Brown also showed a man, twenty-seven years of age, who was admitted to the Austin Hospital in 1927 on account of a non-tuberculous chronic disease of the hip, for which he had been confined to bed for the preceding two years. In 1928, in a radiogram of the lumbar spine, shadows were visible in the left renal area, but no renal pain or colic or urinary symptoms were present. In the radiograms taken in January, 1936, five stones were seen in the lower part of the left ureter, which were removed in April extraperitoneally. A urinary fistula formed, and by cystoscopy it

<sup>1</sup> Since the patient was shown the cavity has been freely opened by Dr. Trumble and the improvement in the patient's condition was immediate.



was found that there was an impassable block of the ureter one inch from the bladder. The kidney was removed in May, 1936, and gross hydronephrosis was present, with multiple small abscesses throughout the kidney substance.

A female patient, forty-one years of age, had her right kidney removed in June, 1936, for calculous hydronephrosis; the kidney was low in position and rotated so that the upper pole presented in the wound and was fixed by a large aberrant artery running behind the pelvis, which was dilated to the size of a cricket ball; division of this artery immediately immobilized the kidney.

Another male patient, thirty-seven years of age, with a past history of gonorrhoea and difficult micturition, had been operated on by Dr. St. Clair Stewart in June, 1934, and extraperitoneal excision of a large diverticulum of the bladder had failed to diminish his pyuria. In May, 1935, another attempt was made to close off the diverticulum without a cure being effected. In September, 1935, when the blood urea was 165 milligrammes per cubic centimetre and the leucocytes numbered 18,000 cells per cubic millimetre, it was discovered at cystoscopy that solid pus was coming from the left ureteric orifice. No stones could be seen in the skiagram, but, as a previous pyelogram had indicated the presence of a dilated tortuous ureter on the left side without gross abnormality of the pelvis, an operation was performed on September 19, 1935, at which an enormous left pyonephrosis was removed. By the end of October, 1935, the blood urea had fallen to 110 milligrammes per cubic centimetre, but the patient could not get rid of the suprapubic tube, and his urine was loaded with stringy pus. On December 10, 1935, a plastic enlargement of the internal urinary meatus and of the diverticular orifice was performed, but as soon as the urethral catheter was removed the patient would micturate once or twice only, and then the suprapubic wound would reopen. He had been discharged from hospital on January 17, 1936, with a suprapubic tube in the bladder.

Dr. Brown also showed the specimens from a male patient, fifty-one years of age, who had been the subject of ureteral and vesical calculi for many years. In 1925 a large vesical calculus had been removed, but pyobacilluria persisted, and in June, 1935, calculi were seen radiographically in the lower part of the left ureter and in the bladder. On cystoscopic examination a stone was felt on passing the instrument through the prostate; a pronounced prostatic bulge was present which prevented the catheter from being passed into the left ureter. In an intravenous pyelogram the pelvis of the left kidney was not well outlined and excretion was poor on that side. In the skiagram calculi were localized in the lower part of the left ureter and bladder; the calculi were removed extraperitoneally on August 6, 1935. Three days later infarction of the middle lobe of the right lung occurred, which settled down in fourteen days clinically. On September 9, 1935, nephrectomy was performed, and the kidney was found to be about the size of a child's football and full of foul-smelling pus. He died on October 4, 1935. At autopsy an old infarct of the middle lobe of the right lung and a large recent infarct in the spleen were seen; the heart was dilated and hypertrophied with large vegetations on the tricuspid valve and smaller vegetations on the aortic valve.

#### Pernicious Anæmia.

Dr. A. R. BUCHANAN showed two patients with pernicious anæmia illustrating interesting complications.

The first, a female patient, forty-seven years of age, in addition to her anæmic condition, was subthyroid. She had shown a serious intolerance to iron in all forms that had been tried. The patient's condition had improved slightly under thyroid medication, but, owing to the iron causing vomiting, great difficulty had been experienced in correcting the mineral deficiency which was present.

Dr. Buchanan's second patient was a male, fifty years of age, who suffered from coronary and general arteriosclerosis. Dr. Buchanan showed a series of electrocardiograms illustrating an interesting series of changes very suspicious of coronary thrombosis, taken while the patient

was at the height of his anæmia, and returning almost to normal as the anæmia was relieved under treatment with liver extract.

#### Bone Syphilis.

Dr. Buchanan also showed a series of skiagrams from a very advanced case of bone syphilis, with additional changes characteristic of Paget's disease in the skull and the spine. Improvements under mercury and iodide therapy were also illustrated.

#### Tumours of the Brain.

Dr. M. MUSHIN presented, on behalf of Dr. H. C. TRUMBLE and Dr. LEONARD COX, a number of patients who had undergone operation for intracranial tumours.

A male patient, twenty-seven years of age, had been admitted to hospital on May 23, 1936, suffering from acromegaly. It had been noticed that, over a period of two years, he was becoming fat and flabby, and vomited frequently. One year before his admission to hospital he had developed temporal headaches; these had increased in intensity and frequency, and were for a period of six months localized behind the eyes; the patient's vision had been gradually failing, and this was particularly noticeable in the left eye. His relatives had noticed a gradual enlargement of his hands and prominence of his eyebrows. The patient's temperament had changed considerably, and he had become very irritable and bad tempered.

On examination he was well nourished, but had displayed the typical bony changes of acromegaly. Examination of the visual fields revealed a right temporal hemianopic defect with concentric constriction. The patient was not otherwise neurologically abnormal. The cerebro-spinal fluid contained 0.1% of protein, the globulin test gave a positive result, and the cells were normal. The Wassermann test yielded no reaction in either blood or cerebro-spinal fluid. A radiogram had shown the pituitary fossa to be enlarged, though possibly within normal limits.

An operation was performed by the right frontal approach on May 29, 1936, under gas and oxygen given by the intratracheal method. The bone, though soft, did not bleed freely. After puncture of the ventricles the dura was opened at the lower border of the bone deficiency, and the right frontal pole was retracted. The tumour was seen to be presenting between the optic nerves, although the main mass lay behind the chiasma and was not visible. The chiasma was thinned out and raised, the space between it and the tubercle being more restricted; the capsule of the tumour was incised and a great deal of well-formed glandular material was removed from within and above the fossa by suction. On section the tumour was found to be a chromophile adenoma of the pituitary gland which had undergone some calcification.

A male patient, seventeen years of age, had been in excellent health until three weeks before his admission to hospital; at that time he had suddenly become giddy and had vomited. The giddiness persisted, the patient was confined to bed, and could lie only on his right side, as any movement from this position produced immediate projectile vomiting; the patient experienced no headache at any time.

On examination he was found to be a powerfully built boy, and the general examination revealed no abnormality. A full neurological examination revealed no abnormality, although his stance and gait could not be tested because of the vomiting. The patient showed no nystagmus on repeated examinations; the usual cerebellar tests gave normal results, and there was no swelling of the optic disks. The cerebro-spinal fluid was found to be under 230 millimetres of pressure, but it was otherwise normal in all respects. Examination of the vestibular function showed that the vertical and horizontal canals of both sides were insensitive to the usual caloric tests, while the patient's hearing was unaffected.

The cerebellum was explored by the suboccipital route and a large mid-line cerebellar cyst was encountered in the upper and posterior part of the wall of which was found a small reddish nodule. The nodule was situated so that it was easily removable with a narrow ring of thinned



out cerebellar cortex. An histological examination showed it to be a hæmangioblastoma.

A male, fifty-four years of age, had been admitted to the Alfred Hospital on February 3, 1936. He had been well until one month before admission, when a fit had occurred. The patient had felt a tingling in the left fingers which spread up the arm to the neck and face; he did not think that he had lost consciousness, but his head turned to the left and he struggled; he had not bitten his tongue, but he passed urine and faeces during the attack. He had had several attacks since, and often several on the one day. Several of these had been observed in the hospital; they commenced with conjugate deviation of the head and eyes to the left, followed by twitching of the left side of the face, general convulsions and unconsciousness. This loss was brief and was followed by a hemiparesis of the left side. According to his own statement, the patient had not suffered with headaches. He had taken a considerable amount of alcohol about thirty years ago. The general examination did not reveal any gross abnormalities; at a general examination it was observed that neither pupil reacted to light and that the left was dilated; the patient stated that these peculiarities had been present for many years. Nystagmoid movements to the right were noted with some paresis of the left side of the face, also a deviation of the tongue to the left. The deep reflexes were equal and active, except that the left biceps jerk was more active than the right; the abdominal reflexes could not be elicited. At the time of the patient's admission to hospital the response to the plantar reflexes was of the flexor type on each side, but later, on the left side, the extensor response was obtained. This was the usual response if the reaction was taken soon after a fit. The power in the left arm was deficient. The left arm, at one stage, was said to be increased in tone, but at certain examinations it was found to be hypotonic. Light touch was frequently not appreciated on the left arm, more particularly below the elbow, and errors in the discrimination of head and point were made. Errors in the localization of stimuli and in position sense were observed in both left limbs, although stereognosis was said to be normal. The cerebro-spinal fluid was under 103 millimetres of pressure, and eight lymphocytes per cubic millimetre were present, with an increase in globulin. The blood and cerebro-spinal fluid did not react to the Wassermann test, and the fundi were normal; no abnormality was detected at radiological examination. A partial left homonymous hemianopia was suggested; the patient's ability to cooperate in any sensory test was limited. At operation on February 27, 1936, a right fronto-temporal bone flap was raised; both bone and dura were vascular. A reddish-grey tumour containing many cystic spaces was found attached to the dura over a large area. Immediate section suggested a malignant tumour, and no attempt was made to remove the dura extensively; subsequent examination suggested that the tumour was a meningioma. The patient was discharged to the out-patient department.

Another male patient, sixty-five years of age, had been admitted to hospital on March 23, 1936. A failure of mental power had been noticed up to five years before his admission to hospital. The patient who had been employed in the railways, was a well self-educated man; he could read Latin and Greek; mental failure had been definite about three years before his admission to hospital. About that time he seemed to have been incontinent of urine and indifferent, so that the bed was constantly soiled; some weakness of the legs had also been noticed. Three years before the patient's admission Dr. Devine had operated upon the prostate and had removed a small portion, said to be non-malignant. He had seen many doctors since, and had been told that he had a malignant bladder. Examination revealed no arteriosclerosis, and that he was organically fairly sound. The prostate was said to be hard and possibly malignant; the patient displayed gross mental deterioration, and was obviously demented, and a full examination was almost impossible owing to his inability to cooperate; however, after constant examination, certain findings were determined. The deep reflexes were more active on the right side, and the right superficial abdominal reflexes were more active than the left; the plantars were

at times equivocal and at times both extensor. A left ankle clonus was present and a right pseudoclonus. Power seemed greater in the right arm, and tone also seemed increased in that arm. Such cooperative tests as he could be occasionally induced to perform were fairly well done, but sensation could only be indifferently determined. There was no analgesia, and the patient appeared at times to recognize the size of small objects in his hands. An operation was performed on April 19, 1936, under intratracheally administered gas and oxygen. The approach was made by raising a large left fronto-temporal osteoplastic flap. The dura was opened anteriorly, and a tumour was seen not far from the external angular protuberance. The bone opening was extended further forwards, and the tumour, a meningioma, was separated from the lip of the lobe, which was adherent over a large area of the dura behind the superciliary ridge and over the orbital plate. The origin was probably from the region of the external angular protuberance. The tumour was looped out by diathermy and removed; its dural base was stripped from the bone and removed.

A female patient, ten years of age, had been admitted to the Alfred Hospital on May 21, 1936; she had had scarlet fever four and one-half years earlier, and had tired quickly ever since. In the previous March she had complained of headaches and giddiness; this had continued until five months before her admission, when she had commenced morning vomiting; the headaches had become more violent about Christmas time; they were bi-temporal and extended around the forehead, and the vomiting was always associated with the headaches. She had been unsteady on her feet for some years and clumsy with her hands, and she was a very highly strung child who was easily upset if she was scolded. The patient herself had said that she was giddy when bending for any length of time, and that she was sometimes weak in the legs, but not in the arms. She was said to be brilliantly clever; for years she had carried her head in a peculiar way. At examination, it was found that she was in a fair state of nutrition, and that she was not suffering any gross discomfort. She sat and stood with the left shoulder slightly raised and the head flexed to the left, the chin appearing slightly rotated to the right. There was no rigidity of the head on flexion on the chest, although the posterior muscles seemed hypotonic. She could stand well with the feet parallel and together if her eyes were open, but she was unsteady with the eyes shut. The patient could not balance on either foot separately, and walked unsteadily with efforts to recover from a tendency to fall to the right. No nystagmus could be elicited, and the arm reflexes were absent; the knee jerk reflexes were elicited, but more easily on the left. The finger-nose test was well carried out, but sometimes showed a fine terminal tremor. Other cerebellar tests were fairly well performed. Following the caloric tests applied to the right ear, no reaction occurred after two minutes, but a good left-sided reaction occurred after one minute; the patient's hearing was good. Full examination revealed no other abnormality. Bilateral papilloedema and enlargement of blind spots were reported on ophthalmological examination of the fundi.

At operation on April 20, 1936, under intratracheally administered gas and oxygen through a suboccipital approach, the right ventricle was tapped before the dura was opened, and the cerebro-spinal fluid was found to be clear and under slightly increased pressure. The cerebellar lobes were parted, showing a tumour mass situated deeply in the upper part of the vermis. This was incised by cutting diathermy, a careful watch being kept for the fourth ventricle and the choroid plexus. The depth of the tumour upwards rendered it unsafe to follow it to its upper limits, so that an opening was made below, in the fourth ventricle, to attempt an attack from that direction; but the tumour was found to have grown deeply down the right side of the fourth ventricle. At that stage the patient's condition rendered it unsafe to attempt a more radical removal. The micro-pathological report was a small celled astrocytoma.

Another patient, a male, fifty-one years of age, had been admitted to hospital on May 9, 1936, with dimness of vision in the left eye and deafness in the right ear since child-

hood; this had become worse during the past eight years. About eight months before his admission to hospital he had suffered with defective balance; he would sway to both sides, but more particularly to the left. At the same time, transient attacks of dimness of vision, which might affect any quadrant of the fields or the entire fields of one eye or of both, occurred. Four months later he experienced a left frontal headache followed by numbness and tingling sensation in the left side of the face and neck, and also a feeling as though his nose was running on the left side. On examination, bilateral papilloedema and coarse nystagmus in both lateral directions were found; when the patient gazed upwards a left nystagmus occurred. A slight left facial paresis was present; and on the right side there was extreme nerve deafness, with an absence of caloric responses; all the other cranial nerves were normal, and all the reflexes equal and active and normal in type. No abnormality was noted in power or muscle tone, and all the coordinative tests were well carried out by the patient; rebound was also normal. The patient was unsteady on standing, and deviated to either side on walking; his speech was also slightly slurred. Sensation of all types was impaired over the second division of the left fifth nerve. The patient carried his head in an abnormal position; the cerebro-spinal fluid pressure was 280 millimetres; the cells were not counted; the protein content was 0.45%, with increased globulin; and the Wassermann and colloidal gold tests gave no reactions.

An operation was performed on May 22, 1936, under intratracheally administered gas and oxygen, through a suboccipital approach, and the bone was vascular. The right ventricle was tapped before the *dura mater* was opened; the fluid was clear, but under definitely increased pressure. The *dura* was incised; the cerebellum was bulging, but not otherwise deformed, and the left angle was inspected, but no tumour detected. An examination of the right angle disclosed the presence of a large solid tumour surmounted by small arachnoidal cysts. The area of the capsule was exposed and the vessels were coagulated. The capsule was incised and a large amount of substance of the tumour was removed by curettage, scraping and suction; the bleeding was easily controlled. The pathologist reported that the tumour was a moderately cellular neuro-fibroma.

#### Neurological Pathology.

Dr. S. SUNDERLAND showed some pathological specimens from the neurological clinic.

The first, from a patient forty years of age, was a diffuse astrocytoma of the right temporal and occipital lobes of the brain, which, following lumbar puncture, had bled into the subarachnoid space from a small hæmorrhage cavity at the pole of the lobe.

Another specimen from a boy, twenty-six years of age, showed a recurrent pituitary tumour occupying the interpeduncular space at the base of the brain. Decompression had been followed by hæmorrhage into the tumour mass and subarachnoid space.

Another specimen was from a girl, fourteen years of age, who had had a history of only two months' duration. The pituitary fossa had been excavated and distended by a reddish gelatinous mass which had spread into both cavernous sinuses, out along the middle cranial fossæ, along the right optic nerve into the orbit, and into both subarachnoid fissures. The mass entirely occupied the interpeduncular fossa, and had spread as far back as the pons and outwards beneath the right temporal lobe. It had burst through the floor of the third ventricle, and had then grown in the ventricle, distending it, and passing as far forwards as both foramina of Monro and as far back as the aqueduct of Sylvius, through which it passed to present in the fourth ventricle. Microscopic section showed a round cell tumour of an identified type.

Dr. Sunderland also showed a brain in the left temporal lobe of which a diffuse astrocytoma had not manifested itself until after a head injury received four months previously.

Another specimen shown by Dr. Sunderland was the brain of a boy, seventeen years of age, which showed a

huge meningioma, seven centimetres in length and nine centimetres in width and six and one-half centimetres in depth, growing from the *falx cerebri*. The tumour, which was mostly pre-Rolandic in situation, had compressed the superior and medial aspects of the left frontal lobe, and, displacing the *falx* to the right, had deeply indented and compressed the medial aspect of the right frontal lobe. In this case the history had been of twelve months' duration, and the neurological signs were conspicuous by their absence.

Another specimen presented was from a patient, twenty-nine years of age, and showed a single secondary carcinomatous nodule in the *corona radiata* of the right cerebral hemisphere, together with a solitary nodule in the left cerebellar lobe. The primary neoplasm was a mucoid carcinoma of the lung.

#### Ophthalmic Conditions.

Dr. J. RINGLAND ANDERSON, assisted by Dr. TRAVERS and Dr. Box, demonstrated a series of patients with fundi of medical interest. Binocular ophthalmoscope and red-free light were used in this work.

Amongst these patients was a man who showed an early thrombosis of one branch of his left central retinal vein, and an old thrombosis with new vessel formation of another branch of the same vein. An example of embolism of the central artery and numerous cases showing varied forms of retinitis were also shown.

A series of patients also showed papilloedema in various stages.

#### THE BRITISH MEDICAL AGENCY OF NEW SOUTH WALES, LIMITED.

The annual ordinary general meeting of the British Medical Agency of New South Wales, Limited, was held at the British Medical Association House, 135, Macquarie Street, Sydney, on October 6, 1936.

The Chairman, Dr. R. B. Wade, presented the sixth annual report of the directors, together with the report of the auditors on the financial result of the fifth year's operations. He said that the agency had made a profit of about 7½% on turnover. This result, while not so good as might be expected, was regarded by the Directors as satisfactory in view of the fact that steady increases in income were experienced in all departments of the business.

The explanation of the various sources of income of the agency having been given in the last annual report, no further comment was thought necessary at this stage, excepting in one particular only, which was that the agency was now acting as "Assistant Secretaries" to the New South Wales Medical Defence Union, Limited, and this would mean an increase in income of about £200 per annum under the heading of "other services".

The gross income from all sources showed an increase of £244 for the year under review. In this year also expenses increased by £241, so that the net profit was approximately the same as that made in the previous year. Canvassing of members in country districts had been proved necessary in order to compete successfully with privately owned agencies, some of which, by virtue of sales of instruments, books, plant *et cetera*, were able to keep in closer touch with such members than the agency could hope to do. There was no doubt, however, that the services undertaken by the agency had proved of very real value to the profession as a whole, and one of the best indications of this was the great increase in the return from commission on *locum tenens* appointments arranged.

With regard to life and endowment assurance, the best evidence of success in this field in the past five years was found in the steady growth of the British Medical Association (New South Wales Branch) Superannuation Fund, which was started in 1932 and now stood at over £250,000. It was anticipated that within the next five years this fund should exceed £500,000 and might possibly be well on the



way to one million pounds. All members were urged to investigate the benefits available under the fund before increasing their life assurance cover with other companies.

Dr. Wade expressed his belief that the business of the agency would continue to grow each year, and spoke of the plans which had been made for the future. Negotiations for the creation of a finance department or company were in progress, and if such negotiations were successful, it would mean that financial assistance could be given to young graduates wishing to acquire practices of their own. It would mean a greater volume of business, such as the supplying of *locum tenentes* and assistants, and new life assurances, as well as commission on sales of practices. In the meantime, members were asked to help the agency by recommendation among their friends and acquaintances within the profession.

In concluding his address, Dr. Wade expressed the thanks of the directors to those members who, by their personal support and cooperation, had contributed towards the agency's present state of usefulness to the profession, and asked for a continuance of that help.

In moving that the retiring directors, Dr. R. B. Wade, Dr. F. Brown Craig and Dr. A. M. Davidson, be reelected for the ensuing year, Dr. George Bell congratulated them on the success of their efforts to date. His motion was seconded by Dr. E. H. M. Stephen and carried unanimously.

#### NOMINATIONS AND ELECTIONS.

The undermentioned has applied for reelection as a member of the British Medical Association (New South Wales Branch):

Nicholl, Harvey, L.R.C.P., L.R.C.S., 1883 (Edinburgh), Terrigal.

The undermentioned have been elected members of the Victorian Branch of the British Medical Association:

Olliphant, Francis Harold, M.B., B.S., 1933 (Univ. Melbourne), 158, Alma Road, East St. Kilda, S.2.

White, John George Glyn, M.B., B.S., 1935 (Univ. Melbourne), 32, Havelock Road, Hawthorn East, E.3.

Anthony, Tom Charlton, M.B., B.S., 1935 (Univ. Melbourne), Royal Australian Air Force, Point Cook.

### Medical Prizes.

#### THE STAWELL MEMORIAL CLINICAL PRIZE.

The Stawell Memorial Clinical Prize, which consists of a money award of £40, is open for competition.

The purpose of the fund from which the prize is given is to commemorate appropriately the memory of the late President-Elect of the 103rd Annual Meeting of the British Medical Association, Sir Richard Stawell, and his great influence in the clinical teaching of medical students and young graduates. Donations to establish the fund were received from members of the medical profession and others, and to it was added a grant by the executive of the 103rd annual meeting.

The following are the conditions governing the first award:

1. The memorial shall take the form of an essay, and competition shall be open to Australian graduates of not more than three years' standing on August 1, 1937.

2. The subject of the essay upon which the prize shall be awarded is: "The clinical significance of pathological changes in the ocular fundus."

3. The work submitted must be based on personal observations and experiences collected by the candidate in medical practice, and a high order of excellence is required.

4. The trustees reserve the right, if no essay is entered of sufficient merit, to withhold the award.

5. Essays must be in the hands of the Trustees, care of the Medical Secretary, British Medical Association (Victorian Branch), 426, Albert Street, East Melbourne, C.2, not later than June 1, 1937.

6. The prize shall be awarded at the Australasian Medical Congress (British Medical Association), Adelaide, August 23 to 28, 1937.

7. No study or essay that has been published in the medical Press or elsewhere will be considered eligible for the prize.

8. If any question arises in reference to the eligibility of the candidate or the admissibility of his or her essay, the decision of the Trustees on any such point shall be final.

9. Each essay must be typewritten or printed, must be distinguished by a motto and must be accompanied by a sealed envelope marked with the same motto, in which envelope must be enclosed the candidate's name and address.

10. The Trustees reserve the right to publish the essay for which the prize is awarded in THE MEDICAL JOURNAL OF AUSTRALIA.

11. Further inquiries relative to the prize should be addressed to the Medical Secretary, British Medical Association (Victorian Branch), 426, Albert Street, East Melbourne, C.2.

C. H. DICKSON,  
Medical Secretary, British  
Medical Association (Victorian Branch).

### Correspondence.

#### ASTHMA AND TUBERCULOSIS.

SIR: IN THE MEDICAL JOURNAL OF AUSTRALIA of October 31 Dr. J. Morris Roe, famed for his knowledge of rare medical literature, writes interestingly of tuberculous asthma.

That asthma may be a manifestation of tuberculosis was taught by Dr. Camac Wilkinson in Sydney thirty years ago, and in my "Studies in Pulmonary Tuberculosis" (Baillière, Tindall and Cox, London, 1911) I referred briefly to it. May I now cite two cases?

Miss C., aged twenty-one, came under the care of Dr. Wilkinson in 1907 with consolidation of the upper lobe of the right lung and severe asthma. He treated her with tuberculin, giving a final dose of 0.85 cubic centimetre of old tuberculin, and she did well. Since he went to London I have seen her from time to time. In 1927 I tested her by hypodermic injections of *Perisucht* tuberculin, 0.1, 0.2 and 0.4 cubic centimetre at weekly intervals; her arm was a little red and sore, but her highest temperature was 99° F., and she was free of asthma. In October, 1936, by a chance encounter in the street, I learned that she was very well.

D.G., aged fourteen, was brought to me by his father in May, 1935; he had had pneumonia in 1924 and asthma since; he lost it on a visit to Forbes and again at Katoomba, but he was compelled to live in Sydney and it returned; he had attended an asthma clinic with very little relief. He had much wheezing and dyspnoea and copious rhonchi throughout both lungs; he weighed less than six stone fully clad; his father asked for injections of tuberculin.

Treatment was at once begun with "T.A.F." (albumose-free tuberculin), 0.0005 cubic centimetre, and continued up to 0.82 cubic centimetre on March 3, 1936; he then



weighed seven stone seven pounds, a gain of over one and a half stone; he was very well and free of asthma. In August he suffered a mild relapse and treatment was resumed with "P.T.", 0.004 cubic centimetre. The asthma rapidly decreased, and on October 13 he weighed eight stone four pounds, and a subcutaneous injection of "P.T.", 0.4 cubic centimetre, caused only trifling local reaction. It is not suggested that tuberculosis is the sole cause of asthma.

Yours, etc.,

GUY GRIFFITHS, M.D.

131, Macquarie Street,  
Sydney,  
November 2, 1936.

## Post-Graduate Work.

### COURSE IN PATHOLOGY.

THE New South Wales Post-Graduate Committee in Medicine announces that two lectures in pathology will be given by Sir Robert Muir, M.A., M.D., Sc.D., LL.D., F.R.S., Emeritus Professor of Pathology, University of Glasgow, as follows:

Tuesday, December 8: "The Main Varieties of Arterial Disease."

Thursday, December 10: "The Nature of Malignancy."

The New South Wales Branch of the British Medical Association has made available to the committee the date, December 10, which is usually occupied by the monthly meeting of the Branch.

The lectures will be held in the Robert H. Todd Assembly Hall, 135, Macquarie Street, Sydney, at 8.15 o'clock p.m. The fee for the two lectures is 10s. 6d. Tickets may be obtained on application to the Secretary, New South Wales Post-Graduate Committee in Medicine, The University of Sydney, Sydney.

## Proceedings of the Australian Medical Boards.

### VICTORIA.

A MEETING of the Medical Board of Victoria was held on September 2, 1936.

The following registrations were effected: Bruce Hunter Anderson, M.B., B.S. (Melbourne), 1936; John Leonard Day, M.B., B.S. (Melbourne), 1925.

The following additional diplomas were registered: Leslie P. Wait, M.D. (Melbourne), 1935; Robert Southby, M.D. (Melbourne), 1923; Heyworth A. W. Watson, F.R.C.S. (England), 1935; Tom A. F. Heale, M.R.C.P. (London), 1928.

The following deaths were reported: David Florance MacGillcuddy, Frederic S. Jermaine-Lulham, Samuel Peacock, Eric William Beresford Woods, Lionel Norton Hoysted and Jacob Rosenthal.

Clifford Leslie Rosenfield submitted evidence that he had changed his surname to Rosefield by deed poll and his application for the alteration of the entry in the register accordingly was approved.

It was decided to arrange a special meeting on December 23 next for the purpose of registering applicants whose degrees are to be conferred at the Melbourne University on December 21.

Arising out of a request for the return of documents produced by a witness at an inquiry held by the Board it was decided to obtain the advice of the Crown Solicitor as to whether there were any objections to the Board's complying.

Consideration of a request received from the Medical Council of India that certain British Indian diplomas be recognized as registrable qualifications in Victoria was deferred pending further inquiries.

Reports were obtained in two cases in which it appeared from Press advertisements that unregistered persons had, in contravention of the *Medical Acts*, assumed medical titles. It was decided to take no further action in respect of an advertisement relating to Ethel T. Stoneman. In the case of Mary Charles Butler it was reported that after delivering lectures in Melbourne this person immediately left for Brisbane, and it was decided to forward this information to the Medical Board of Queensland.

The Police Department brought under notice the alleged action of W. McQ. S. Siddeley, who is not a registered medical practitioner but is practising as an eyesight specialist in Melbourne, in furnishing a member of the police force with a certificate of disability for purposes of an application for sick leave. As it appeared that this was a matter which might more appropriately be considered by the Opticians' Registration Board, the papers were forwarded to that authority.

The question of holding an inquiry into the alleged conduct of a registered practitioner in inserting in newspapers a series of advertisements relative to his special practice in the treatment of genito-urinary and acquired diseases was further considered and it was resolved to proceed in respect of six recent advertisements.

A practitioner who inquired as to his position in selling gland extracts to patients was referred to the Dangerous Drugs Regulations made under the *Poisons Act*.

The Secretary reported that Sir Hugh Devine had been appointed a member of the Board in place of Dr. G. J. Hodgson, who had resigned. Sir Hugh Devine was welcomed to the meeting by the Chairman.

### NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1912 and 1915, of New South Wales, as duly qualified medical practitioners:

Drew, John Grahame, M.R.C.S., 1922 (England), L.R.C.P., 1922 (London), M.B., B.Chir., 1923 (Cambridge), D.T.M. and H., 1930, D.P.H., 1932 (Univ. Sydney), Department of Public Health, Sydney.

Malaher, Arthur Ernest, L.S.A., 1901 (London), Nimbin.

Tunbridge, Ewen Ballantyne, M.B., B.S., 1926 (Univ. Melbourne), Broken Hill.

### TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts*, 1925 to 1933, of duly qualified medical practitioners:

Brothers, Charles Ronald David, M.B., B.S., 1927, M.D., 1931 (Univ. Melbourne), Mental Hospital, New Norfolk.

Day, Robert Sydney, M.B., B.S., 1934 (Univ. Adelaide), The General Hospital, Hobart.

### QUEENSLAND.

THE undermentioned has been registered, pursuant to the provisions of *The Medical Acts*, 1925 to 1933, of Queensland, as a duly qualified medical practitioner:

Broome, Gerald Douglas, M.B., B.S., 1923 (Univ. Melbourne), D.T.M., 1932 (Univ. Sydney), Toowoomba.

**Obituary.****ROBERT WALLACE.**

We regret to announce the death of Dr. Robert Wallace, which occurred on November 2, 1936, at Rosewood, Queensland.

**EDWARD ALFRED STRAHAN.**

We regret to announce the death of Dr. Edward Alfred Strahan, which occurred on November 4, 1936, at Carlton, Victoria.

**Diary for the Month.**

- Nov. 17.—Tasmanian Branch, B.M.A.: Council.  
 Nov. 17.—New South Wales Branch, B.M.A.: Ethics Committee.  
 Nov. 18.—Western Australian Branch, B.M.A.: Branch.  
 Nov. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.  
 Nov. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.  
 Nov. 25.—Victorian Branch, B.M.A.: Council.  
 Nov. 26.—South Australian Branch, B.M.A.: Branch.  
 Nov. 26.—New South Wales Branch, B.M.A.: Branch.  
 Nov. 27.—Queensland Branch, B.M.A.: Council.  
 DEC. 1.—Tasmanian Branch, B.M.A.: Council.  
 DEC. 1.—New South Wales Branch, B.M.A.: Executive and Finance Committee.  
 DEC. 2.—Victorian Branch, B.M.A.: Annual Meeting.  
 DEC. 2.—Western Australian Branch, B.M.A.: Council.  
 DEC. 3.—South Australian Branch, B.M.A.: Council.  
 DEC. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.  
 DEC. 8.—New South Wales Branch, B.M.A.: Ethics Committee.  
 DEC. 8.—Tasmanian Branch, B.M.A.: Branch.  
 DEC. 10.—New South Wales Branch, B.M.A.: Branch.  
 DEC. 10.—Victorian Branch, B.M.A.: Council.  
 DEC. 11.—Queensland Branch, B.M.A.: Annual Meeting.

**Medical Appointments.**

Dr. J. M. Sleeman has been appointed Certifying Medical Practitioner at Sea Lake, Victoria, pursuant to the provisions of the *Workers' Compensation Act, 1928*, of Victoria.

Dr. J. M. Smith has been appointed Government Medical Officer at Esk, Queensland.

**Medical Appointments Vacant, etc.**

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xx-xxii.

- AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Honorary Radio-Diagnostician.  
 BUNDABERG HOSPITAL, BUNDABERG, QUEENSLAND: Junior Resident Medical Officer.  
 DEPARTMENT OF PUBLIC HEALTH, PERTH, WESTERN AUSTRALIA: Medical Officer.  
 DIRECTOR-GENERAL OF PUBLIC HEALTH, SYDNEY, NEW SOUTH WALES: Honorary Dermatologist, Visiting Medical Officer.  
 GEELONG AND DISTRICT HOSPITAL, GEELONG, VICTORIA: Resident Medical Officer.  
 LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.  
 MOOROOPTA HOSPITAL, MOOROOPTA, VICTORIA: Resident Medical Officers.  
 ST. GEORGE DISTRICT HOSPITAL, KOGARAH, NEW SOUTH WALES: Resident Medical Officers.  
 VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE, VICTORIA: Resident Medical Officers.

**Medical Appointments: Important Notice.**

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY Hospital are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

**Editorial Notices.**

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

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